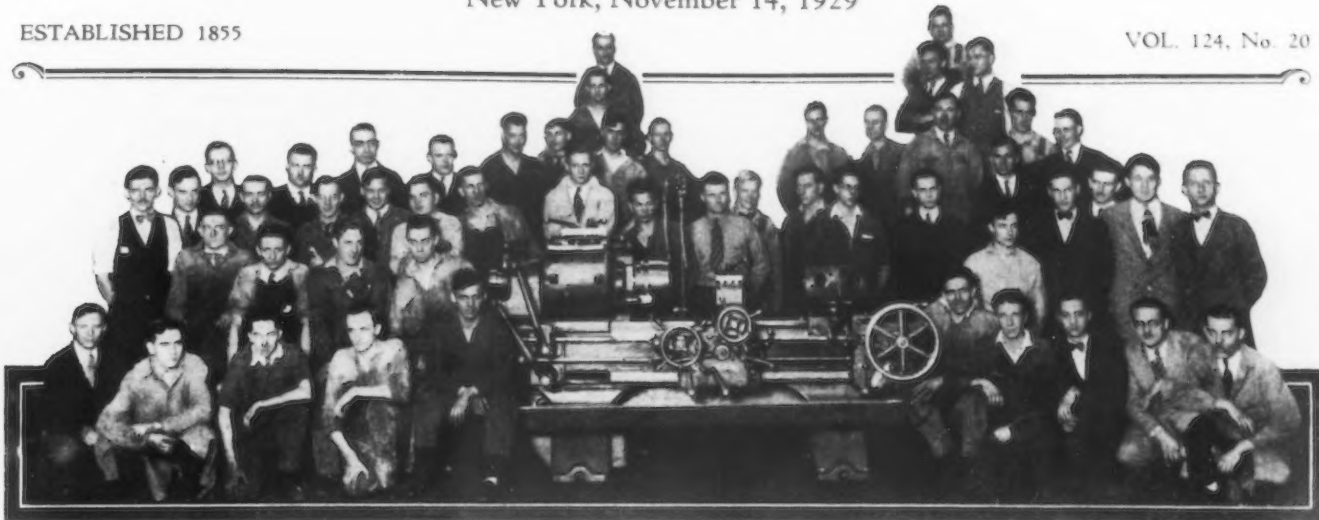


THE IRON AGE

New York, November 14, 1929

ESTABLISHED 1855

VOL. 124, No. 20



Apprentice Training Pays Dividends

New High Standards Result in Developing Young Men
for Responsible Executive and Technical Positions

BY F. L. PRENTISS*

HIGHER standards of apprenticeship training and entrance requirements which call for more extended preliminary public school education have been adopted by the Warner & Swasey Co., Cleveland, in its apprentice training school with a view to obtaining

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a higher goal in developing young men for responsible executive and technical positions in modern industry.

With changed conditions in production, men with specialized training have in large measure replaced skilled machinists as machine operators in production shops, usually working an indefinite time in repetitional opera-



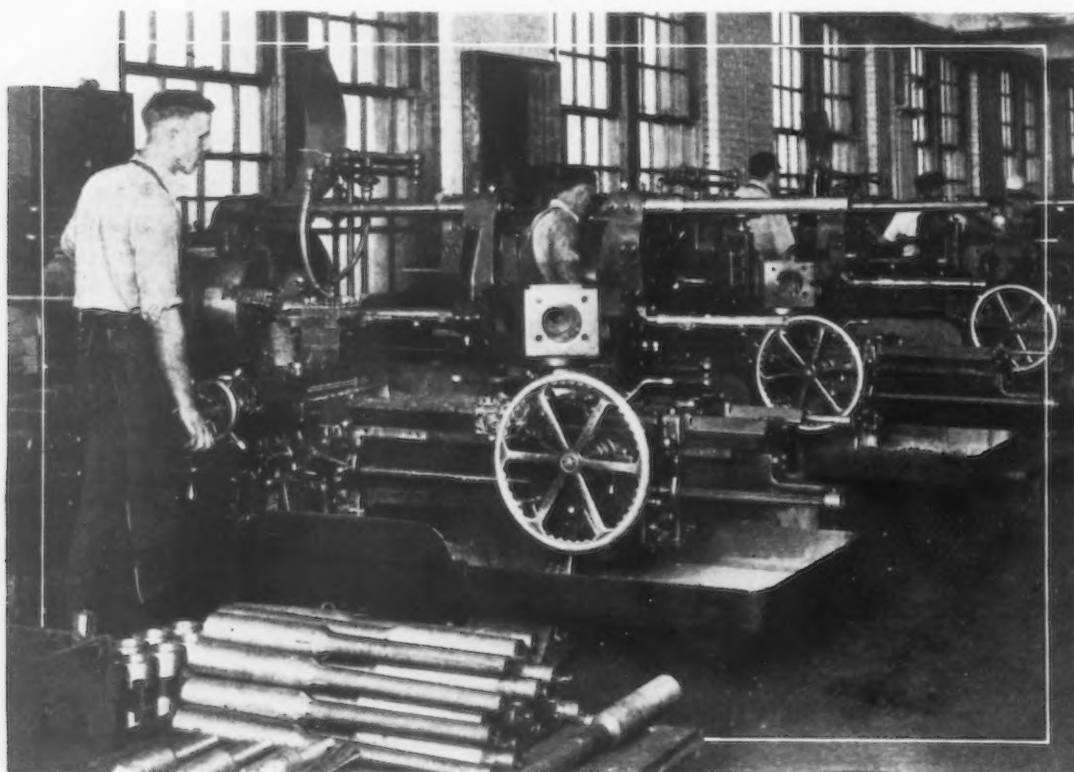
The Apprenticeship Training Class of the Warner & Swasey Co. Is Shown in the Upper Illustration. The lower illustration shows blackboard instruction in a class room

tions. While specialization, of course, has contributed to mass production, it has frequently been pointed out that the development of the man has been neglected except for his own routine operations and he has not been given an opportunity to broaden to an extent that he will become potential executive timber. On the other hand, with the growth of industries there has come an increase in the demand for men capable of filling the various supervisory and technical positions.

In successful operation for 45 years, the Warner & Swasey training school has made minor changes from time to time in its standard methods in order to keep pace with the changing conditions in industry. Whatever at times crept in the school organization that was re-

schools in Cleveland, this being advised whether they are high school graduates or not. In making up a curriculum of night school studies, the apprentice is aided by the supervisor of the apprentice school in the selection of studies that will fit in well with his work. Night school attendance is also emphasized to the whole personnel of the company.

The applicant must be physically sound and of good habits and character. Extreme care is taken in the selection of apprentices in order to secure the right type of young men or those who give promise of having latent talent that will make them fitted for the mechanical field. To avoid the possibility of improper placement, the student who is admitted is taken for a six months' probationary



STUDENTS Are Put on Machines at the Start, the Shop Training Being Augmented by Class Room Work. There is no shop training room, but apprentices are assigned to the various production departments in rotation, each apprentice being under the direct supervision of a foreman. Usually four machines in each department are reserved for the use of apprentices

garded as too much red tape was speedily eliminated, and simplicity marks the operation of the school. It is run along practical and flexible lines with low overhead and very little clerical detail.

Plant Executives Are School Graduates

While the fundamental purpose of the Warner & Swasey training school—to give a good mechanical training as a stepping stone for higher positions—is not new, it is being emphasized by the raising of the standards. Its past success in this direction is shown by the fact that the works manager, two superintendents, the chief designer, metallurgist, estimators, time-study men, several foremen and assistant foremen, some branch office managers and several salesmen are graduates of the school. Other graduates hold important positions with other companies.

Formerly applicants who had passed through the eighth grade of the public school were admitted to the training school. Now the young men to be enrolled must have an education equivalent to at least two years' work in a Cleveland high school. However, a majority of the new pupils are high school graduates. The age limit of admission has been narrowed, now being 17 to 19 years, as compared with a former range of 16 to 20 years. It is desired that all apprentice supplement their work in the apprentice school by attending one of the various night

period. That is regarded as a sufficient time to judge his adaptability.

Probationary Period the Important Test

During the trial or probation period the apprentice system is put to an important test. The work during that period must be of training value if the purpose of the trial period is to be fulfilled. The apprentice is given a class of work that is interesting and at the same time not too difficult or he will become discouraged. During this period it must be decided for the good of the young man and his employer whether the former has the ability to master the trade. If it is found that he has selected a vocation for which he is not fitted, it is only fair to him that he is not permitted to serve the four-year course.

A report of the applicant's progress and general deportment is made to the superintendent at the first of each month during the trial period. If at any time it is found that he is not qualified for his work, his services may be terminated. If the applicant is found satisfactory at the expiration of his trial term, he is engaged as a regular apprentice and signs an agreement to remain with the company 3½ years longer.

While there is no definite division of apprentices in their classroom and shop work, under the flexible arrangement that prevails they can be fairly well divided into two groups based on their preliminary education. Those with

[illegible]

COMPLETE Records Are Kept of the Work Done by Apprentices. A monthly record is made up by the foremen in the department in which an apprentice is working, and the data from this shop record are used in making up another record which includes grades for school work. A quarterly report is sent to the boys' parents. Still another blank is used in transferring a boy from one department to another.

only two years in high school generally become shop employees and will fill positions as foremen, assistant foremen, inspectors and tool makers.

The apprentices who are high school graduates usually get more out of their apprentice course than the boys in the other group and are inclined to qualify for more responsible positions, including those of junior engineers. The training usually qualifies the apprentices in this group to hold positions of other usefulness than shop work and they probably would become discontented if kept in the shop an indefinite time. These apprentices in many cases are fitted to become designers, estimators, time-study men and to go into the sales department. Many develop into good designers because of their wide shop experience and advanced technical training accomplished by earnest application to night school efforts.

While not graduate engineers, they have a rather broad preliminary training in engineering, being given a good grounding of the fundamentals of engineering. However, all apprentices, regardless of their pre-apprenticeship education, are on the same footing. They are given the same opportunity to succeed whether they are high school graduates or not.

Aim Is to Train Production Experts

The school aims to train experts in production. The students are put on machines at the start and the shop training is augmented by class room instruction in such subjects as are applicable to the everyday shop experience of the boy. The curriculum has passed through an evolution founded on past experience. The week's schedule includes 45 hr. of shop work and 4 hr. in the class room, class room work being for 40 weeks of the year. This includes such subjects as shop mathematics, machine drawing, applied mechanics, materials of construction and organization. The curriculum follows:

First year: shop arithmetic, vernier reading, gearing speeds and feeds, taper measuring, etc.; algebra with practical applications; shop practice, machine tools, care and operation; mechanical drawing, principles of engineering drawing.

Second year: algebra, shop practice and mechanical drawing, continuation of the first year.

Third year: mechanics, practical and applied mechanics; trigonometry, practical application to shop problems, mechanical drawing, detail drawing.

Fourth year: metals, chemistry, manufacture and physical properties of materials of construction, etc.; metallography, heat treatment; machine design, gears, cams, etc.; shop electricity—a course for the non-electrical student.

A feature of the system is that there is no shop training room. Apprentices are assigned to the production departments, where they start production work on machines. Each apprentice is assigned to a foreman and is always under his jurisdiction. The foreman, however, is in part relieved of instruction by a shop instructor, who is an assistant to the school supervisor. Apprentices work on a production basis and are eligible to bonus.

Apprentices Routed Through Entire Plant

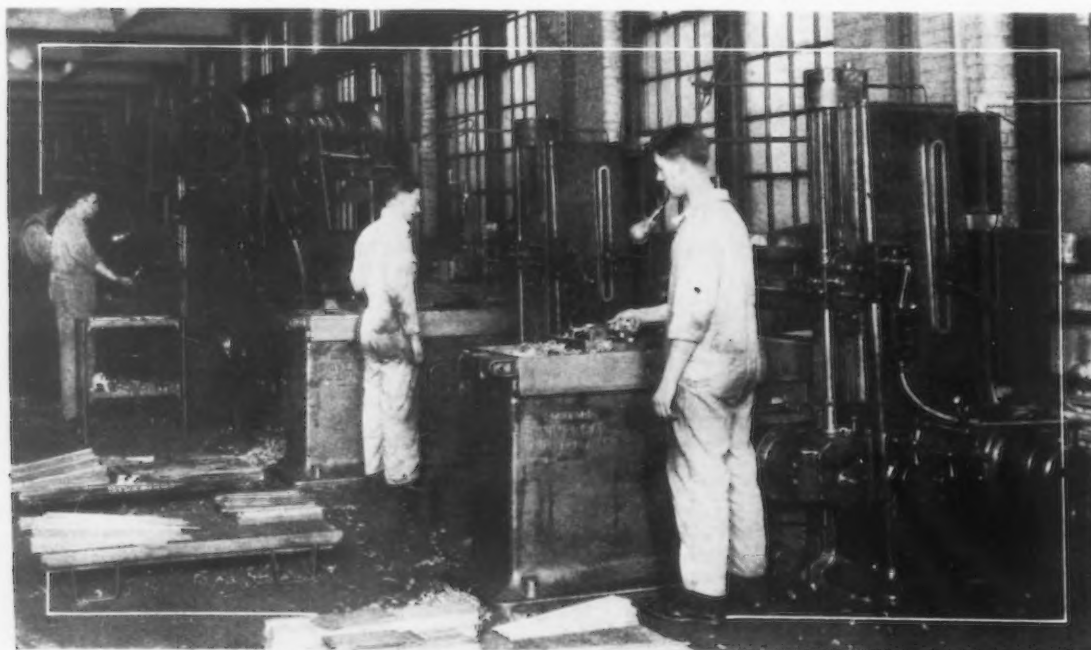
The boy is routed through the entire plant in a systematic way in order to give him an opportunity to gain complete knowledge of shop practice. This is accomplished by following a prescribed department schedule that was recently rearranged to eliminate work in departments that would mean a repetition of work already done and duplication of effort and at the same time to provide a logical sequence of training on various types of machines.

The method of scheduling fits in with the arrangement of equipment, which is grouped according to machines. Four apprentices are at work at a time in most departments and they spend four months in each of the 12 departments. An apprentice divides his time between different types of machines of the same general classification in each department and spends from one to two months on each machine except on a turret lathe, to which he devotes four months. For example, starting in the drilling department the apprentice spends two months on a vertical and two months on a radial drill. He follows the schedule through, being trained on the various types of machines in sequence and at the end of 40 months reaches the tool room. After leaving this he devotes four months to miscellaneous work. During the last four months he is given training along any special line that he may wish and may seem best fitted to follow. On the following page is the apprentice shop schedule.

Machines, usually four in number, are reserved for the apprentices in most departments. With this plan an apprentice is always guaranteed a machine on which to work, and with four-month periods the scheduled changes become simplified.

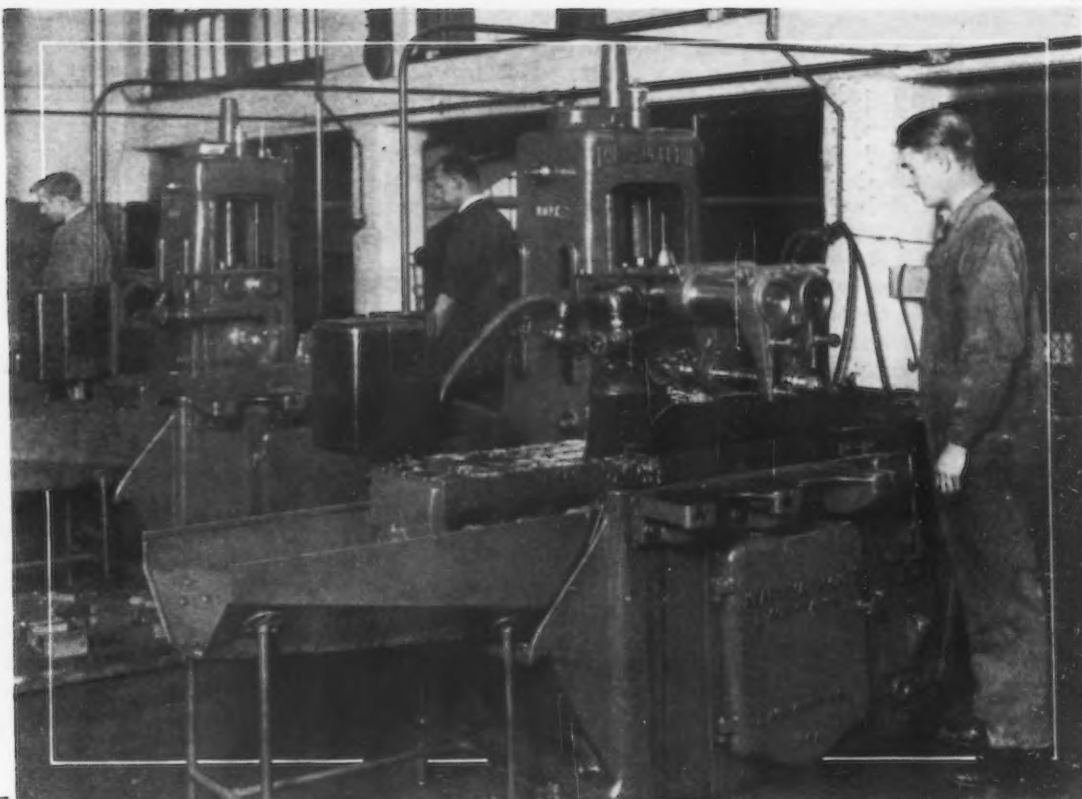
Apprentices' Jobs Are Secure

An apprentice who is industrious, shows the proper capacity and complies with the rules and regulations is sure of holding his job, for he is never discharged because of curtailment of plant operations. There is an established



APPRENTICES at Work in the Planer Department. This and other pictures show that the apprentices are given their shop training on the best types of production equipment

APPRENTICES Operating Modern Type Sim- plex Milling Ma- chines



rule that the number of apprentices in a department shall be limited to a maximum of 13 per cent of the total number of producers, but the number is usually kept below that percentage so that the danger is avoided of exceeding the percentage in case of a falling off in business.

Various activities are provided to interest the boys and encourage them to show their capacities. An annual essay contest is held, the boys competing in the writing of an essay or in the solving of a mechanical problem. Cash awards and trips to other industrial cities are the prizes. This contest has done much to stimulate interest, initiative and individual enthusiasm among the boys. Another activity is "The W. & S. Apprentice," a monthly publication edited by the apprentices. Material is prepared for the most part by the apprentices and the publication is distributed to the entire personnel of the company.

The Apprentice Club is an organization of graduates and apprentices and is carried on entirely by them. Meetings are held once a month and are preceded by a supper served in the company's cafeteria. The club's function is both educational and social.

Complete Records Kept of Boys' Work

A complete and accurate record is kept of each young man's work. A monthly apprentice shop record is made up by the foreman in the department in which he is located at the time. The data from the shop record is used in making up an apprentice work record, on which is also placed the grades for school work. A quarterly apprentice report is also made out and sent to the boys' parents. Letters are used for symbols in grading similar to the plan used in public schools. Another form provided is for the transfer of a boy from one department to another. This, signed by the apprentice and employment departments, gives complete authority for the transfer. In addition to these records, written reports of the workmanship, fitness and deportment of each apprentice, together with recommendations as to his future work, are made to the superintendent quarterly during the entire term of apprenticeship.

The boys are paid 25c. per hr. during the first six months of their apprenticeship and their pay is raised 2½c. per hr. at the end of each six months' period, so that during their last six months of training they are earning 42½c. per hr. They receive pay for the time spent in class room work. On completing his four years' training, each boy receives a gratuity of \$100, a graduation pin and a certificate of apprenticeship in acknowledgment of his four years of faithful service.

School Pays Dividends in Production

Two questions frequently are asked in connection with an apprenticeship system. One is, "Does it pay?" and the other is, "Does a sufficient percentage of the apprentices remain with the company after graduation?" The Warner & Swasey Co. school is paying good dividends in produc-

APPRENTICE SHOP SCHEDULE

Department	Apprentices in Department	Departmental Analysis	Ma-chines Re-quired	Months Each Ma-chine	Total Months in Department
Drilling	4	Vertical	2	2	..
		Radial	2	2	4
Screw machine	4	Nos. 4 and 6 mchs.	4	4	4
Heat treating, tool supply	4	Heat treating	..	2	..
		Tool supply	..	2	4
Milling	4	Horizontal	2	2	..
		Vertical	1	1	..
		Simplex	1	1	4
Lathe and grinding	4	Engine lathe	1	1	..
		Surface grind'ng	1	1	..
		External grinding	1	1	..
		Internal grinding	1	1	4
Assembly sub-unit	4	Ram type units	..	2	..
		Saddle type units	..	2	4
Planing	4	Planer shapers	2	2	..
		3 x 10 planer	1	1	..
		Horizontal boring mill	1	1	4
Assembly—Ram type	4	Main machine	..	..	4
Assembly—Saddle type	4	Main machine	..	..	4
Turret lathe operation		Bar machine	1	2	..
saddle type	2	Chuck machine	1	2	4
Tool room	4	General work	..	..	4
Miscellaneous	6		..	..	4

tion. The work of the boys is satisfactory both in quality and volume. Apprentices having an average of three years' training are showing a shop efficiency of 85 per cent. In fixing the bonus for regular mechanics the shop efficiency is based at 75 per cent. The second question is also answered in the affirmative. Of the graduates of the school since 1915 more than 50 per cent are still in the employ of the company, and surely an important fact is that nearly all these hold responsible executive or technical positions and very few are in the ranks of machine operators. Of the 56 graduates since 1915 who are still employed by the company, four are tool makers, 11 are inspectors, one assembler, three estimators, one sales correspondent, six foremen, three assistant foremen, five machine operators, four designers, four demonstrators, two pattern makers, one tool room clerk, one purchasing clerk, one production clerk, six in sales department, one in cost department and two on time study.

The fact that the Warner & Swasey Co. has continued the practice of training apprentices for so many years is in itself evidence of the soundness of the policy. There is ample room—and indeed great need—for increasing the business of apprentice training throughout the metal-working industry.

Apprenticeships, in one form or another, have existed throughout the ages. Manufacturers have experimented from time to time to determine the most efficient way of

training men for a given industry. At the present time many seem to believe that mass production has eliminated the need for trained men other than the specialized types. But, permit business to become active, and the lack of trained men becomes the same old complaint.

Chromium Plating on Brass or Iron

Chromium, when plated on brass or iron, is often faulty through errors in the preliminary deposition of nickel and not in the subsequent plating with chromium, according to W. Phanhauser, in a recent issue of *Chemiker Zeitung*. Evolution of hydrogen during deposition of chromium and its absorption in the metal cannot be avoided. As the hydrogen readily diffuses from the chromium into the nickel, the capacity of the latter for the gas may easily be exceeded. This results in brittleness, non-adhesion and in peeling, either during the plating of chromium or soon afterwards. To deposit a nickel coating as low in hydrogen as possible, the author recommends the use of baths which give a sufficiently strong and ductile product, low in hydrogen, which is adaptable for subsequent chromium plating, even with the use of high current densities. Insufficient removal of grease from brass before application of the nickel also causes blisters in the chromium plating.

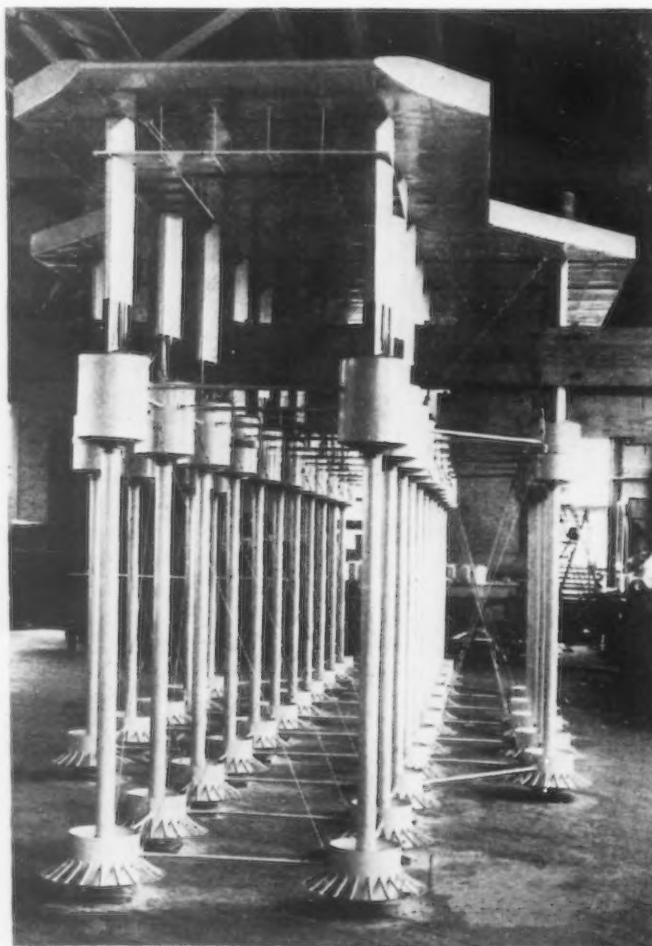
Armstrong Seadrome Will Require 15,000 Tons of Steel

THE Armstrong seadrome, a floating landing field to aid transatlantic air navigation, will require about 15,000 tons of structural steel and plates. About 9000 tons of pig iron or other suitable ballast material also will be used. Estimates are now being taken on the cost of building the first of the Armstrong seadromes. It is possible that the work will be divided between the Sun Shipbuilding Co., Chester, Pa., and the Belmont Iron Works, Philadelphia.

An accompanying illustration shows a working model of the seadrome. This model has withstood tests in which heavy storm conditions have been simulated. The actual seadrome will be 1100 ft. long and 340 ft. wide. Its legs, which are for anchorage, will extend downward 252 ft. The platform will be 80 ft. above the normal water line.

During the tests, some of which effected conditions of waves up to 180 ft. high, the seadrome model remained practically level, without pitch or roll, according to the inventor, Edward H. Armstrong, an engineer with E. I. Du Pont de Nemours

& Co., Wilmington, Del. Henry J. Gielow, Inc., naval architect, New York, has worked on the plans for the anchorage. An anchorage cable 21,150 ft. long will be used.



When the first seadrome has proved itself practical, others will be built so that a chain will provide landing fields about 400 miles apart across the Atlantic Ocean. The first one will be anchored midway between New York and Bermuda.

These seadromes will be equipped with various facilities such as small hotels, gasoline filling stations, repair shops, etc. They will also have radio apparatus, enabling them to keep in touch with airplanes at sea.

The designers say that these seadromes will remain virtually stationary during the heaviest storms at sea. Airplanes will be able to land on their decks, refuel and take off again.

Mr. Armstrong has been working on this project for years and has had the advice and cooperation of such organizations as the General Electric Co., Radio Corporation of America, John A. Roebling's Sons Co. and the Sperry Gyroscope Co.

Lubricating Problems in Rolling

Water Introduces Detrimental Factors—How Various Types of Mills May Be Adequately Greased

DISCUSSION of lubrication in the presence of water occupied the September number of *Lubrication*, published monthly by the Texas Co., New York. Essential characteristics of lubricants were outlined and then their application to various types of equipment, with water splashing over the bearings, was entered into in some detail. What was said about conditions in steel mills is covered in the following paragraphs.

Water on Roll Drives Causes Trouble

In steel plant service hot water or steam conditions will frequently prevail in the blooming mill as well as on certain other rolling machinery. This is because it is often found necessary to run water constantly over the rolls and roll necks for the dual purpose of cooling and blowing off scale as ingots, bars or billets are broken down.

Some mills, in addition, blow steam directly on to the ingot during its first pass through the rolls, to remove the scale more effectively. Such conditions, coupled with the extreme heat which is constantly encountered, place a most exacting requirement upon the roll-neck and gear lubricants. These must, therefore, be compounded products, inasmuch as straight mineral lubricants cannot withstand the continued washing action of hot water.

The usual procedure is to compound the gear lubricant with definite percentages of certain substances which will give the final product the desired adhesive properties. Any rolling mill gearing, however, which does not come in contact with water can readily be lubricated with a straight mineral gear compound, of a viscosity ranging from 2000 to 5000 sec. Saybolt, according to temperature conditions and the manner of lubrication.

The pinions adjacent to the roll necks in the blooming mill are usually inclosed in an oil-tight casing. In this event they are run in a bath of specially prepared gear compound of high adhesive characteristics, having a viscosity of about 2000 sec. Saybolt at 210 deg. Fahr.

In some installations, however, these pinions may be only covered with shields which are not oil-tight. Where this is done there is often no bottom to the gear case; therefore, bath lubrication is out of the question. Hence the lubricant must be able to stick tenaciously to the pinions over the periods which intervene between applications, and maintain a sufficiently protective film. A viscosity of about 5000 sec. Saybolt at 210 deg. Fahr. has been found to be necessary to make the resultant lubricating film able to withstand the terrific pounding and hammering which occurs, especially when the mill is reversed.

Continuous Mills

Rolls of continuous mills are usually driven by herringbone pinions and a set of relatively heavy gears. These pinions in such a mill are often so constructed as to make it necessary to lubricate the bearings with grease and to maintain a continuous flow of cooling water over them.

Naturally this water will splash on to the pinions (where exposed), involving a condition and requiring a grade of lubricant such as was mentioned in discussing the blooming mill. Certain mills, however, may be built with

oil-tight gear cases and suitable shields which will permit bath lubrication. This, of course, is the admirable condition, for the utmost of protection is afforded both the lubricant and the gear teeth.

Table Rollers

Bevel gears which drive the table rollers nearest to any rolling mill frequently operate exposed. They are, therefore, subject to water conditions, flying scale and the heat which radiates from the hot metal in its course through the plant. Here the gear lubricant is difficult to apply, in the first place, and, furthermore, after it has been applied, there is every obstacle put in the way of its functioning effectively. Centrifugal force will tend to throw it off, especially where it has suffered any extensive reduction in viscosity, due to overheating.

The washing action of the water which splashes over such gears is a detriment also. In addition, excessive contamination by solid foreign matter can hardly be avoided, unless precaution is taken to guard such gears effectively. Ultimate protection can be attained, therefore, only by frequent applications of a lubricant which has been so refined as to withstand these detrimental conditions.

Usually the same product as recommended for the blooming mill gears must be used, having a viscosity of from 1000 to 2000 sec. Saybolt at 210 deg. Fahr., according to weather and temperature conditions. It should be applied by pouring on to the teeth at the point of mesh while the gears are running inward.

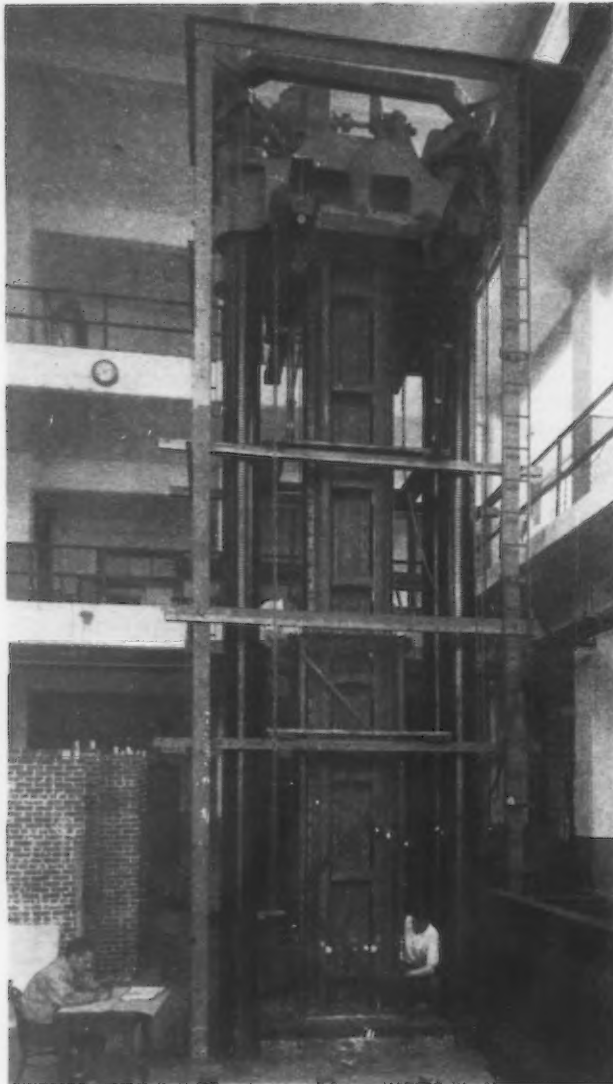
Salt on Plate Mills Detrimental

Plate mills present an additional detrimental condition, from the quantities of de-scaling salt which are thrown on the plates during rolling, and also from the red hot plates passing directly over bearings and gears of table rollers.

Often water is sprayed on the rolls in addition. These factors, coupled with flying scale and dust which is driven with considerable force when the hot gases explode, tend to destroy any lubricant used on the roll necks, table roller bearings and gears. Gear compounds as specified above, however, have been found to withstand these detrimental elements quite satisfactorily, if applied at frequent intervals and in sufficient quantities.

Here an additional property which the gear lubricant must possess is an ability to resist being thinned out by the oil which is used on the pinion bearings, inasmuch as a good deal of this latter will often work out and go on to the gear teeth, especially in older types of mills.

Roll necks must be lubricated with a specially compounded roll-neck grease that will not carbonize nor wash off when in contact with the water run over them to keep them cool. Lubricants used on such roll necks are termed cold-neck greases. In general, they are tallow-mineral oil compounds, often being so prepared as to emulsify on contact with water. Frequently, however, water is not used. Even where it is, the necks may run so hot as to melt down a cold-neck grease. In such cases a hot-neck grease must be substituted, despite added friction and wear.



Hudson River Bridge Column (Half Dimensional Size) in 10,000,000-lb. Testing Machine Ready for Test

EXTENDED use of so-called structural silicon steel and of medium manganese structural steel by the Port of New York Authority has already been noted in *THE IRON AGE*.^{*} Approximately 33,000 tons of the former has been bought for tower, floor and anchorage members of the 3500-ft. suspension bridge over the Hudson, and 5500 tons of the second named will go into the 1675-ft. arch to be built over Kill van Kull, nearly all into the bottom chord.

Extended studies of these steels (as well as other more common materials of construction) are being made by the bridge department of the Port Authority, including tests to destruction of half-size fabricated members. Some preliminary results on the strength of large columns fabricated of three types of steel are now available, and give a direct comparison of the different steels as they would be expected to behave in a bridge.

For this work the 10,000,000-lb. testing machine at the United States Bureau of Standards, Washington, was used. Six columns were 24 ft. long, about 160 sq. in. in cross section, and dimensionally one-half size specimens of the base columns of the towers of the Hudson River suspension bridge. Two others were dimensionally one-half size of a representative member of the lower chord of the Kill van Kull arch bridge. The six first mentioned were identical in size and make up, except that two were

^{*}Aug. 25, 1927, page 466, and June 13, 1929, page 1643.

Test on Large Structural

fabricated of ordinary structural steel, two of the so-called structural silicon steel, and two of a new type of medium manganese steel known as carbon-manganese structural steel. (The main web plates of the latter specimen columns were reduced in thickness slightly to keep within the capacity of the testing machine.) The Kill van Kull specimens were of the third type, viz., medium manganese steel.

Specifications for the Three Types

Physical specifications for the three types contain the following principal requirements:

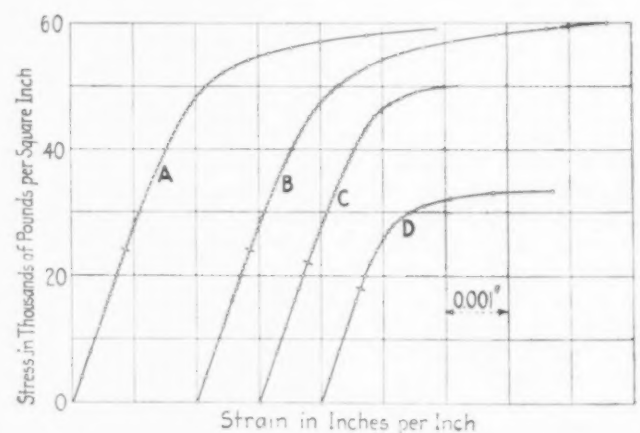
	Carbon Steel	Silicon Steel	Manganese Steel
Tensile strength.....	58,000 to 68,000	80,000 to 95,000	90,000 or more
Yield point, minimum.....	35,000	45,000 (a)	55,000
Reduction in area, minimum (b)	42	30	30

(a) Average for each group of 10 heats must be at least 47,000 lb. per sq. in.

(b) Sections over $\frac{3}{4}$ in. thick may be slightly less ductile.

In all types the material, $\frac{3}{4}$ in. thick or less, must bend 180 deg. without fracture about a pin whose diameter is equal to the thickness of the test piece. Elongation in 8 in. must also be greater than the figure derived by dividing 1,500,000 by the ultimate strength, with certain allowances for plates or sections thicker than 1 in. for the silicon steel and $\frac{3}{4}$ in. for the other two varieties.

Chemical specifications for silicon structural steel are as follows: carbon less than 0.40 per cent, phosphorus less than 0.04 per cent, sulphur less than 0.04 per cent and silicon between 0.20 and 0.45 per cent.



Stress-Strain Curves of Large Compression Members

A is half dimensional model of section of Kill van Kull arch, made of medium manganese steel; proportional limit of model is at 24,000 lb. per sq. in.

B, C, and D are half dimensional models of columns for towers of Hudson River suspension bridge, identical except for type of steel used. B is of medium manganese steel; proportional limit of model is at 24,000 lb. per sq. in. C is of structural silicon steel; proportional limit of model is at 22,000 lb. per sq. in. D is of ordinary structural steel; proportional limit of model is at 18,000 lb. per sq. in.

Columns of Alloy Steel

Medium manganese steel is to analyze as follows, for shapes and rivets:

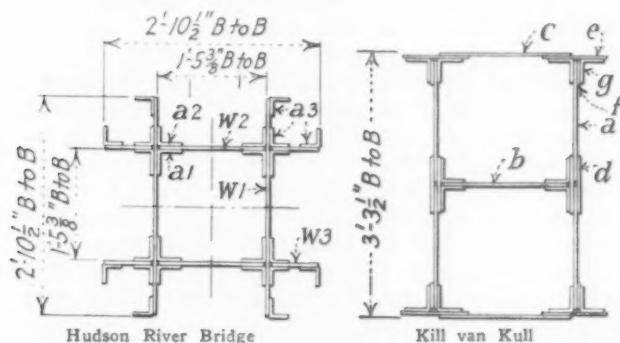
		Structural Steel	Rivets
Carbon	{ Preferably, not over	0.35	0.30
	{ Maximum	0.40	0.35
Manganese	{ not over	1.80	1.80
Phosphorus	{ Acid steel, not over	0.05	0.04
	{ Basic steel, not over	0.04	0.04
Sulphur	{ not over	0.05	0.045
Silicon		0.10 to 0.30	0.10 to 0.30

Check analyses are made by the Port Authority from finished material representing each melt. If the results of such check analyses show an excess beyond the limits specified of more than 10 per cent for carbon or silicon, 5 per cent for manganese and 25 per cent for phosphorus and sulphur, it is cause for rejection. The sum of the carbon and manganese content on check analyses should preferably be less than 2.05 per cent.

Large Columns Tested to Failure

Cross sections of the columns (diaphragms not indicated) are shown herewith; also some representative views of the tests. One view of the test in progress shows the steel scaffold surrounding the entire testing machine to enable the observers to reach any part of the column, and a special latticed structure built close to the column, which served as base lines to determine deflections and any tendencies toward geometrical distortion during test.

Total compression was measured by a group of 16 micrometer dials, built into compressometers 20 ft. long, four for each face of the Hudson bridge columns. The picture shows two of them on the edges of the outstanding flanges and two on the reentrant angles (one obscured in the view). In testing, the load was increased by increments and held stationary until all observations were made. This routine was continued step by step until the total deformation overran the range of the measuring instru-



Hudson River Bridge

Kill van Kull

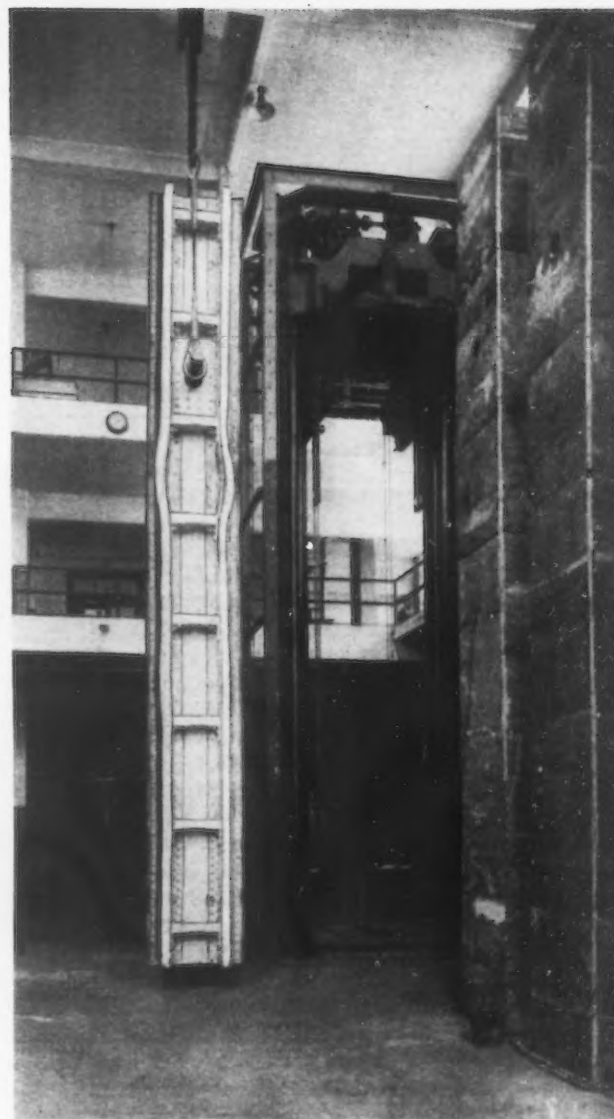
MAIN MATERIAL

2 Pls. 34 3/8 x 5/8 w1
2 Pls. 17 x 5/8 w2
4 Pls. 7 5/8 x 5/8 w3
4 Ls 4 x 4 x 9/16 a1
8 Ls 4 x 3 x 1/2 a2
12 Ls 3 x 3 x 1/2 a3

MAIN MATERIAL

4 Pls. 19 1/4 x 9/16 a
1 Pl. 20 1/4 x 1/2 b
2 Pls. 21 x 3/8 c
4 Pls. 9 x 1/2 d
4 Pls. 10 x 3/8 e
4 Pls. 4 x 1/2 f
12 Ls 4 x 4 x 1/2 g

Cross Section of Columns, Diaphragms Not Shown



Typical Failure After Severe Over Stressing All Test Columns of This Design, Irrespective of Material Used

ments, which approximated the maximum carrying capacity of the column.

At that time a series of load-time measurements were made to determine whether the "pick-up" phenomena were present. "Pick-up" is a term used to designate a progressive strengthening of a column after long continued loading beyond the stress which causes considerable deformation. It is associated with a change in the modulus of elasticity at stresses beyond the proportional limit. In these tests the carbon steel columns showed 3200 lb. per sq. in. "pick-up," the silicon steel columns 3000 and 1900 lb. per sq. in. respectively, and the manganese steel columns did not show the phenomenon.

Some results of the tests are tabulated. Stress-strain curves are shown; curves for duplicate columns are nearly identical.

Elastic Limit of Columns Much Below Yield Point of Tension Specimens

It will be observed that the true elastic limit of the fabricated column (or at least that load where the linear relation between stress and strain undoubtedly ceases) is very much lower than the minimum yield point called for in the specifications. The latter figures are more nearly approximated by the stress at which failure as a column commenced. These columns were relatively short (ratio of length to least radius of gyration being 28.9 and 23.7 respectively), so there was no marked deflection of the

Summary of Results on Bridge Columns						
Material	Dimensions of Column			Calculated Yield Points From Mill Tests, Lb. per Sq. In.	Column Test and Data	
	Length	Area	Least Radius of Gyration		Proportional Limit (b), Lb. per Sq. In.	Stress at Failure (c), Lb. per Sq. In.
Hudson River Bridge Columns						
Carbon steel.....	24 ft.	159 sq. in.	9.97	40,200	17,000	33,600
Carbon steel.....	24 ft.	159 sq. in.	9.97	40,200	18,000	33,500
Silicon steel.....	24 ft.	159 sq. in.	9.97	54,900	22,000	52,800
Silicon steel.....	24 ft.	159 sq. in.	9.97	54,900	20,000	53,000
Manganese steel.....	24 ft.	155 sq. in. (a)	9.97	59,300	24,000	61,560
Manganese steel.....	24 ft.	155 sq. in. (a)	9.97	59,300	22,000	62,280
Kill van Kull Bridge Chords						
Manganese steel.....	20 ft. 9 in.	144 sq. in.	10.51	59,600	24,000	59,000
Manganese steel.....	20 ft. 9 in.	144 sq. in.	10.51	59,600	23,000	58,650

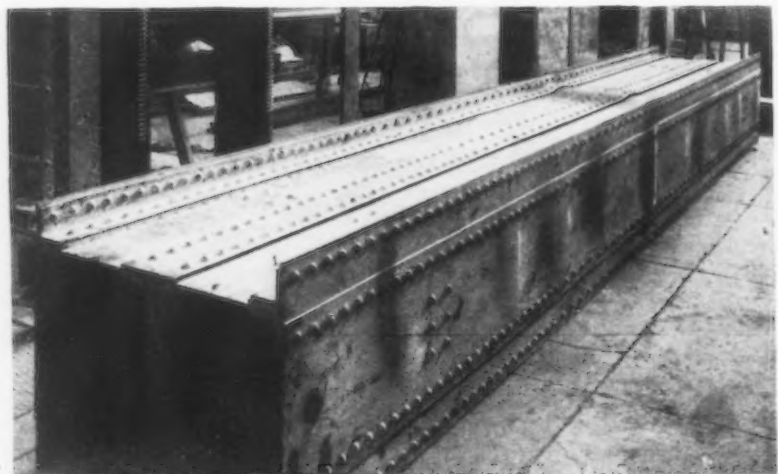
(a) Main webs reduced 1/16 in. to keep column strength within capacity of testing machine.
(b) Determined from stress-strain curve.
(c) Stress at failure is as understood in column testing procedure.

column as a whole until ample evidence had developed that the column was at the point of failure.

Mill test coupons were taken from each rolling of angles and plates used in the fabrication of the test columns, and the anticipated yield point of the whole column, as figured from the weighted average yield point of such test pieces, is given in the table. It will be noted that the carbon steel columns failed at about 84 per cent of the calculated yield point, the silicon steel columns at about 96 per cent, and the manganese steel columns at 99 per cent or better.

Careful observations during the tests indicated the plates or angles which failed first, and thus gave an opportunity to adjust the design of the bridge member to secure maximum efficiency of the sections. These details are beyond the scope of the present article, which is primarily written to show that the use of silicon and manganese steel in box-section columns will result in members having a much greater load-carrying ability than if made of the conventional carbon steel.

The investigation was supervised by O. H. Ammann,



Buckling of Cover Plates in Medium Manganese Steel Column, Half Size Those to Be Used in Kill van Kull Arch Bridge

chief engineer of bridges, and Robert S. Johnston, engineer of research and tests for the Port of New York Authority, with the help of the United States Bureau of Standards, especially of Dr. A. H. Stang of the bureau staff.

Izett Steel—What It Is and How Made

WHEN the German liner, the Bremen, made its first appearance in New York, statements appeared in the daily press that the boilers were made of a new steel known as "Izett," coined from the German letters *I* and *Z* which stand for the two German words "immer zähe" which mean "always tough." The statement was also made that this steel is to be manufactured in the United States, under Krupp patents, exclusively by the Central Alloy Steel Corporation. Outstanding characteristics of this steel were pointed out that it does not become brittle when cold worked and that it prevents formation of cracks, especially in rivet holes and at rivet heads.

Investigation of boiler failures was traced to aging of the steel in the field; in other words, becoming brittle. This aging phenomenon reveals itself in a considerable decrease of the ability to withstand deformation. In numerous cases it was also found that the failures of boilers were aggravated by the influence of alkaline feed water. Investigations disclosed that the sensibility of the steel to brittleness under the influence of alkaline feed water was closely connected with this aging phenomenon. The process of aging presupposes that a steel sensible to aging has been submitted to cold deformation which, however, is obviously unavoidable in the manufacture of boilers.

When inquiries were instituted by THE IRON AGE to learn just what this new steel was and how it is made, immediate results were unsuccessful. As a result of further inquiries the following statement states the facts as near as they can be learned:

The new product is not an alloy steel; it is a carefully made open-hearth steel. In conjunction with exercising the utmost care in making a high-grade product, the steel is thoroughly "washed" with manganese during the melting process. It is then killed with aluminum so that in the final product there is about 0.02 per cent aluminum in the steel. Samples of this steel after rolling are tested in a tensile testing machine and annealed at 200 deg. C. The test should show stress lines after suitable etching and is used to show that steel so treated has the same notch toughness as the same steel untreated, thus indicating that the steel is anti-aging.

The story goes that when certain German metallurgists heard of some American and British boiler steels which had unusual properties as to cracking and resistance to boiler corrosion, comparisons were made of these steels with some of the German products. A distinct difference was found between the German steel and the American and British. As a result of careful studies, the new Izett steel was produced.

Flash Welding Simplifies Production

All-Steel Body Made of 17 Major Parts Instead of 300—Spot Welds Reduced from 1050 to 125 by Coordinating Design to New Manufacturing Method

A GREAT reduction in the number of welding operations required to build an all-steel automobile body is emphasized by Joseph W. Meadowcroft, assistant works manager, Edward G. Budd Mfg. Co., Philadelphia.* Some 15 years ago his company's production consisted entirely of touring car bodies, and the amount of welding required was:

Electric spot welds.....	1000 to 1100
Oxy-acetylene	70 to 80 in.
Metallic arc.....	10 to 12 in.

Continual study on simplification and adaptation of design to constantly improved machinery has changed these figures materially. At the present time the whole side of a sedan body is formed from a single sheet of steel, as described in *THE IRON AGE*, Sept. 13, 1928. The body, therefore, consists of four major units, viz., right side, left side, rear and cowl. The first three mentioned are joined in a

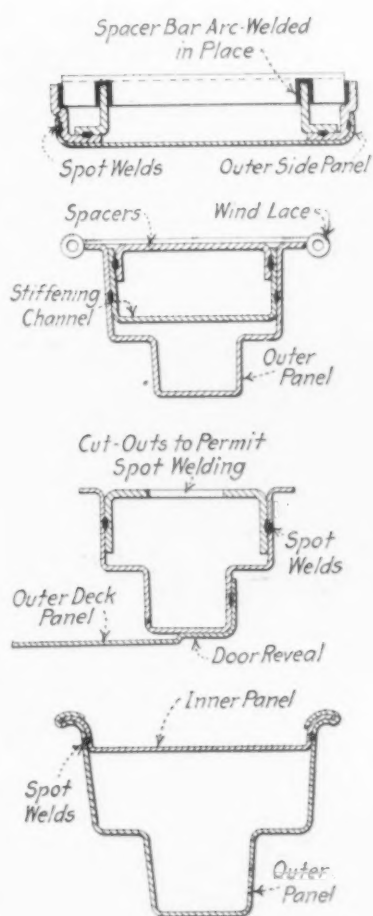
*"The Importance of Welding in the Production of All-Steel Automobile Bodies," a paper read before the World Engineering Congress, Tokio, Japan.

large flash welding machine; views of it and the finished weld before smoothing are shown.

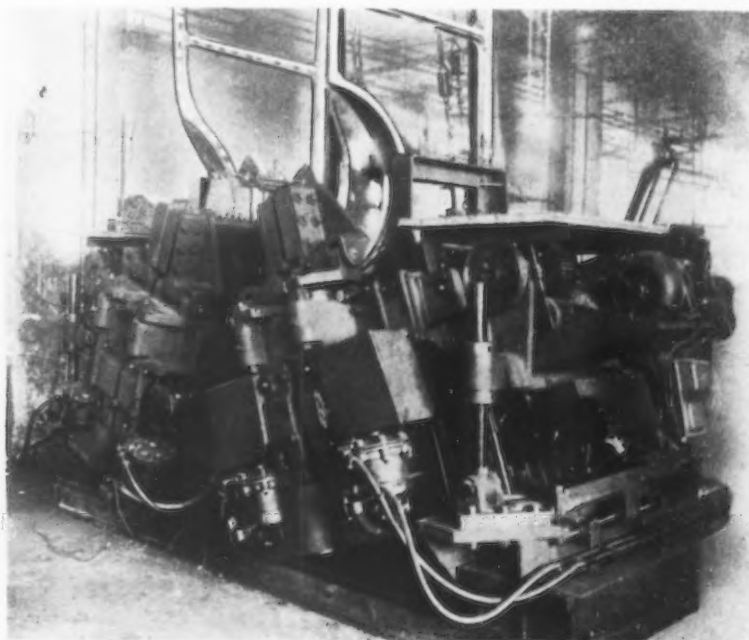
This new construction requires the following amount of welding for each complete closed body:

Spot welds.....	125
Gas welding	42 in.
Metallic arc weld.....	4 in.
Electric flash weld.....	216 in.

Evolution of the center door post from a part made up of a multiplicity of small pieces spot welded together, and at times difficult of access by the welding dies, to the modern one consisting of two pieces only with flanged edges spot welded and crimped over. The first design also shows the influence of the composite structure (wood skeleton and sheet steel cover) in the heavier load carrying members and the light sheet metal outside panels. The latest construction is so arranged that the highly finished sheathing takes its share of the stresses—in fact, is an integral part of the structure. This makes for economy in the welding and lessens the weight of steel.



E VOLUTION of Center Post of Automobile Body from Composite of Many Pieces, Thick and Thin, to Two Flanged Members Spot Welded and Crimped



F LASH Welding Machine for Joining Tonneau Back and Side Panels Into a Single Piece (Above)

F LASH of Extruded Metal Along Seams at Rear Corners of All-Steel Automobile Bodies (At Right)



Automatic Heat-Treating Unit

Three Interconnected Furnaces in Studebaker Plant
Have Great Flexibility in Use—Save
Much Labor Cost

BY W. M. HEPBURN*

A UNIVERSAL heat-treating unit has been installed at the recently expanded and modernized plant of the Studebaker Corporation, South Bend, Ind., for normalizing, hardening, quenching and drawing.† These functions may be separated for various heat treatments, according to the requirements of production.

Flexibility in a wide range of heat treatments is paralleled by flexibility as to size of work. All kinds of forgings, from the smallest to large axles, are treated interchangeably by altering the time cycles and temperature gradients of the various units. The range in size is possible because a standard grid type tray, of alloy steel and 14 in. wide, is used to carry the work through.

With this method the work will travel through all three furnaces and the quench automatically and continuously, with the attention of but two operators. One loads the work on to the trays at the charging end of the first furnace and the other reloads the work as it emerges from the quench, preparatory to going through the drawing furnace. This heat-treating unit was developed and built by Surface Combustion Co., Toledo, Ohio.

Brick construction throughout was used in the furnaces,

9 in. of firebrick and 9 in. of insulation being used. The drawing furnace is 26 ft. long and the other two 20 ft., all three being 6.5 ft. wide and 3.2 ft. high. The heat gradient is obtained in each furnace by dividing it into three zones, preheating, heating and soaking. A separate automatic temperature control is located in the heating and soaking zones of each, with recording pyrometers.

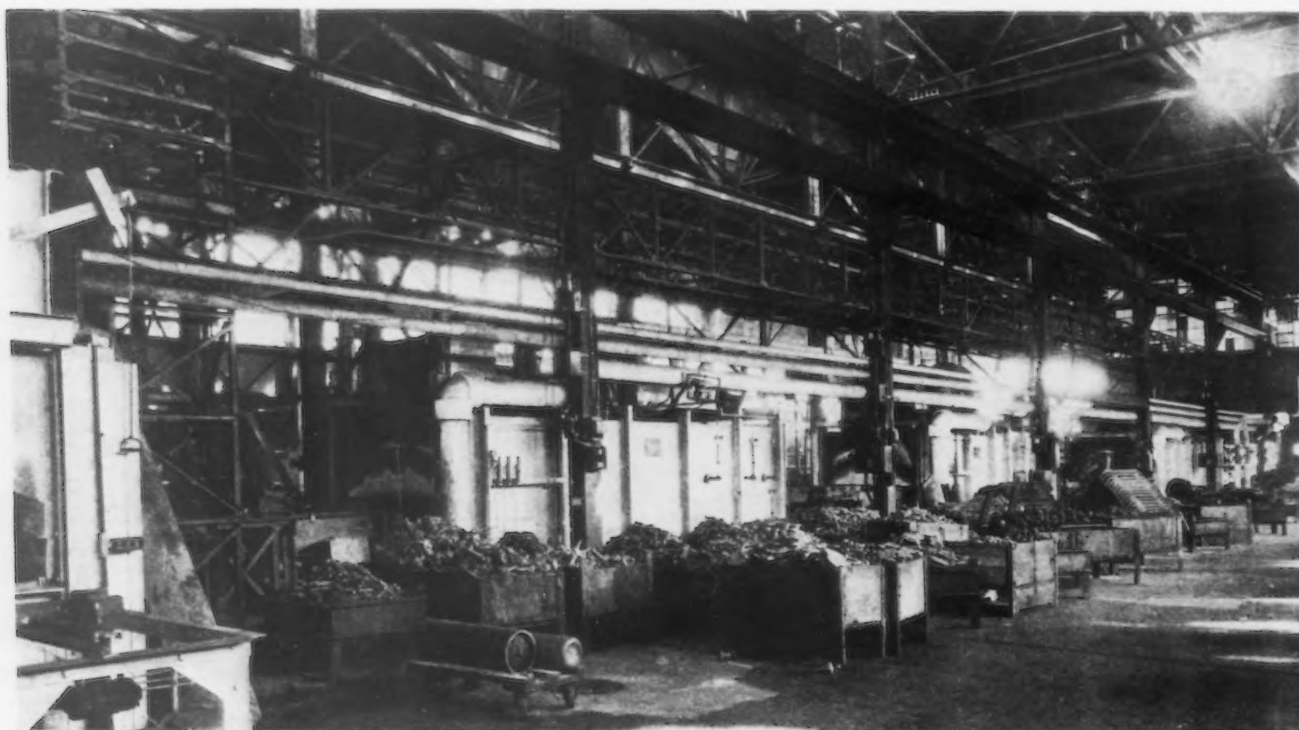
These furnaces are fired with both gas and oil, gas burners being used in the soaking zone, where accurate heat control and perfect heat distribution are necessary. The oil burners are in the heating zone, where maximum heat input is required. The products of combustion pass toward the charging end, giving up considerable heat to the cold incoming work, thereby increasing the efficiency of the furnace.

Another point of efficiency is the recuperator. Waste heat from the furnaces passes out through a vent in the roof, close to the loading end, in which the recuperator is placed. Fresh air for oil combustion is forced through a coil in this recuperator, where it is heated to about 600 deg. Fahr., and then delivered to the oil burners.

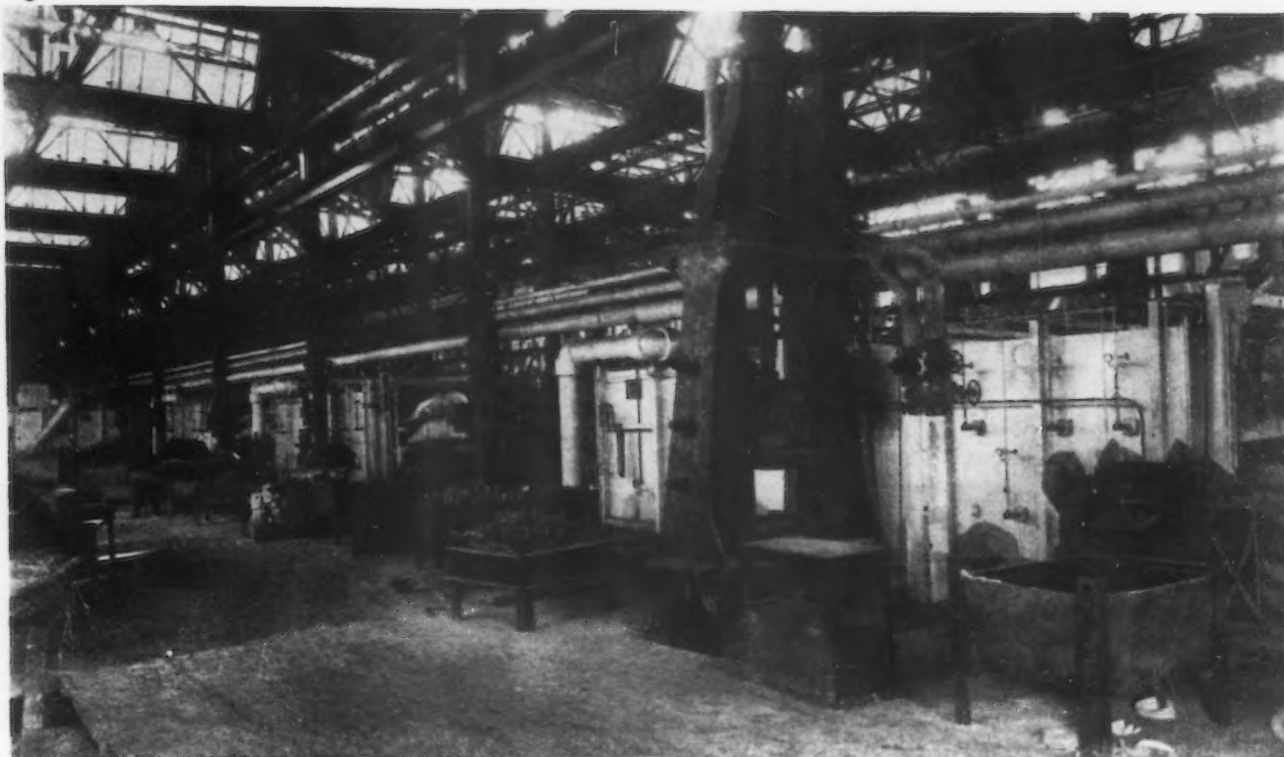
On the hearth of each furnace are four alloy steel rails. The trays of work are pushed through on these by a mechanical pusher, which is motor-driven through a bell-crank link drive. The length of the period the work

*Surface Combustion Co., Toledo, Ohio

†This is similar in many particulars to the universal heat-treating unit in the Packard plant, described in THE IRON AGE of Sept. 12, page 663.



NORMALIZING, Hardening and Drawing Furnaces, in Line, Viewed from Charging End. Above will be noted the overhead conveyor for returning trays, delivering them at left of illustration.



Drawing, Hardening and Normalizing Furnaces, from Discharge End. At right is noted the discharge of a cross-conveyor into tote box

remains in the furnace is regulated by the frequency with which the pusher operates; this, in turn, controlled by a time clock.

A mechanical puller reaches into the furnace at the discharge end, engages the trunnions on the trays and pulls them forward. This puller is operated by the same time clock as the pusher, in series with a relay to correct for the time lag between the two. The puller is auxiliary to the pusher, as it is not practical to put all the load on the latter. The pushers and pullers on all three furnaces can be controlled from the same time clock, with the relays

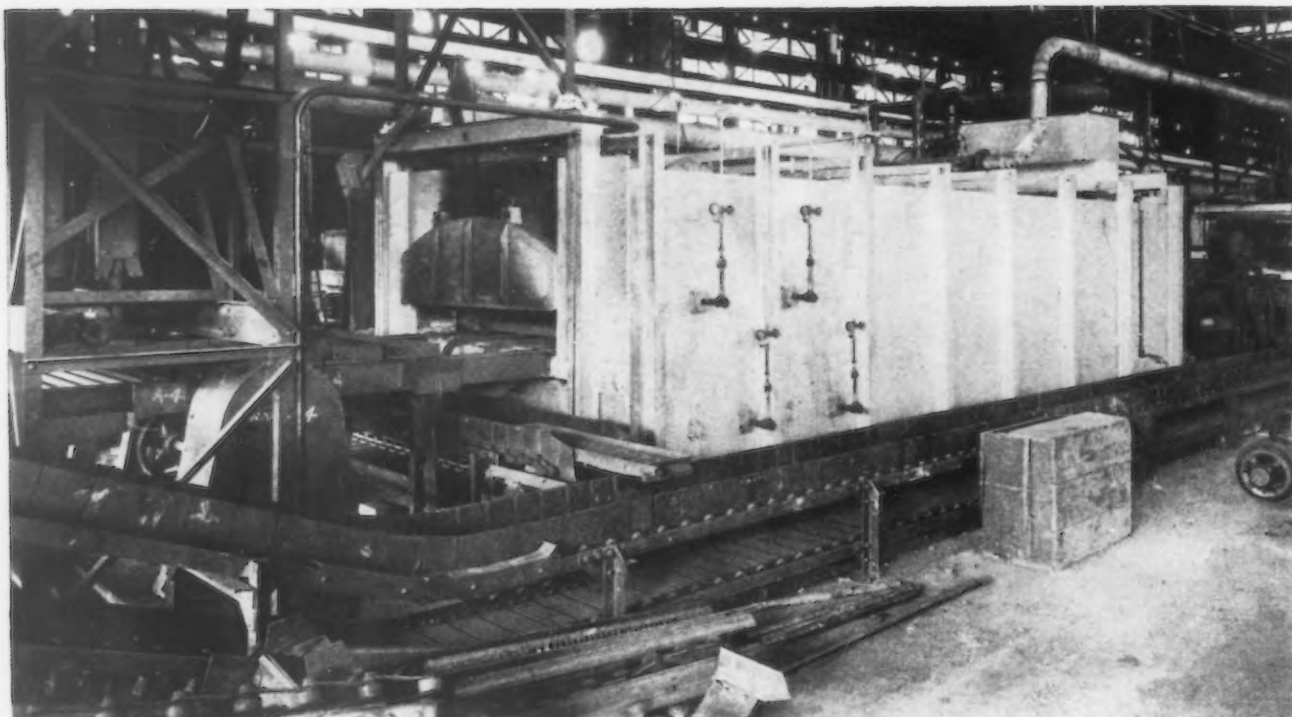
mentioned, when all furnaces are being used in combination heat treatment.

When the normalizer is used alone, separately from the other furnaces, the work is automatically dumped on to a traveling cooling conveyor at the discharge end. It is carried along for about an hour, when it is dumped automatically into tote boxes for further handling.

If hardening and drawing are to follow the normalizing, the trays of work are pushed along the crossover conveyor between the normalizing and hardening furnaces, and into the latter. This crossover conveyor is of the



Discharge End of Normalizing Furnace. Several of the trays, on crossover conveyor, indicate their design, with trunnions at leading edge. The cross conveyor, delivering to cooling conveyor in foreground, is for work which does not require hardening or drawing



Discharge End of Drawing Furnace, With Elevator for Empty Trays at Left. Cooling conveyor is in foreground

roller type; its 22 ft. of length allows for proper cooling before hardening.

At the discharge end of the hardening furnace the work is dumped through a chute into the quench tank. A slat-type conveyor brings it out of the quench to the loading platform for the drawing furnace, where an operator reloads it again in the trays. These trays have trunnions, one on each end and both on the advancing side. The trays ride on the rails through the hardening furnace to the discharge end; here the trunnions ride up on to short rails in the side of the furnace. As the trays leave the supporting rails they upset and, swinging by the trunnions, allow the work to slide off into the quench.

The trunnions of the trays are engaged, before dumping, by the puller, which pulls the trays out on to another conveyor bridging the space between the hardening and drawing furnaces and places them in position to be reloaded.

Similar to the others except that it operates at lower temperature, the drawing furnace next receives the work, which is pushed through as described. At the unloading end of this furnace the trays are pulled out and the work is dumped on to a slat chain conveyor for cooling. At the end of this the work is dumped off into the boxes for further handling.

After dumping, the trunnions of the trays are caught by dogs on two parallel moving chains which carry them up and over the furnaces, back to the charging end of the normalizing furnace. Here they are dropped on to another dog chain conveyor which brings them up to the charging table.

These furnaces are used to heat treat such parts as connecting rods, steering knuckles, steering knuckle arms, steering arms, etc. Precise control over the material going into these parts and over the heat treatment of them is maintained through inspection and laboratory checks.

Does Overstress Increase or Decrease the Endurance Limit?

THERE seems to be doubt whether moderate overstressing will or will not decrease the endurance of steel to alternating stresses. Prof. H. F. Moore of Urbana, Ill., has cited tests to show that it will; Messrs. Smith, Connor and Armstrong described some experiments indicating the opposite in a paper entitled "Correlation of Fatigue and Overstresses" read before the recent meeting of the (British) Iron and Steel Institute.

The latter authors' experiments were of the "short-time" variety; a specimen is loaded in rapidly alternating tension and compression, a further direct stress is then superimposed upon it, and the relation between this direct stress and the resulting strain is measured. By increasing the superimposed strain gradually a definite yield point can be found, and experience with the method for 20 years convinces the authors that this yield point corresponds with the limiting fatigue range.

Samples cut from a 0.19 per cent carbon steel were

placed under various alternating stresses, including those where the mean stress was zero and those where it mounted up to 30,000 lb. per sq. in. tension, and the same value in compression. For several such conditions the yield range was established. The work was then repeated on samples which had been overstressed 10,000 to 20,000 cycles, and the yield ranges on such overstressed samples were always greater than corresponding results for the steel in its primitive state.

The conclusion that overstress increases the endurance limit (yield range) of steel is fortified by experiments on a 6-in. steel railroad axle (0.37 per cent carbon), which failed by fatigue at each end after about 35 years' service. Samples cut from the surface had a yield range (zero mean stress) of plus or minus 36,000 lb. per sq. in., whereas samples cut from near the center, where the working stresses were quite moderate, yielded at 33,300 lb. per sq. in.

Steel Making Practices Reviewed

Many Questions of Quality Control, Combustion, Mechanical Equipment and Furnace Design Taken Up by Open-Hearth Men

MORE than 130 men were in attendance at the Open-Hearth Committee meeting of the American Institute of Mining and Metallurgical Engineers, held at the Hotel Stevens, Chicago, Nov. 5 and 6. This was much the largest representation of steel men which has been gathered together during the five years of these semi-annual meetings.

Four half-day sessions were held, each devoted to a "round-table" discussion of a general topic of importance to steel makers. Leo F. Reinartz, assistant general superintendent, American Rolling Mill Co., Middletown, Ohio, and chairman of the conference, presided. No set papers were presented, aside from a few committee reports, which were brief.

Preference Between Mixers and Mixer Ladles

METAL mixers were compared with Pugh mixer ladles in a number of ways by several speakers. In one instance two Pugh ladles of 125 tons capacity were used in an open-hearth department making 60,000 tons of ingots a month. These ladles were running about 50,000 tons of iron between linings, and the cost of the new lining was from \$800 to \$1,000. Practically no skull loss was experienced except a little around the neck, which amounted to about $\frac{1}{2}$ per cent.

Preference was expressed in this case for a mixer, because it gives the opportunity to get a better mix in the metal. However, as the plant in question has only one blast furnace, the Pugh ladle is used, as it was cheaper than to install a mixer.

Another plant making 150,000 tons of steel a month uses four 100-ton Pugh ladles and also a mixer. The Pugh ladles give much less scrap loss, running to a difference of about 3 lb. of runner scrap and 17 lb. of ladle scrap for a ton of steel. This plant reported 83,000 tons of iron in the Pugh ladles between linings.

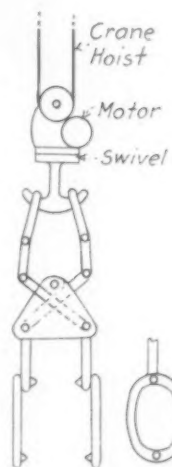
Carrying Molten Iron 11 Miles

Three Pugh ladles are used in one case to transport molten iron 11 miles from a 550-ton blast furnace, making six casts a day. There is very little heat lost and the skulls are a minimum, being not over $\frac{1}{4}$ per cent in the transfer ladle. To this must be added $\frac{1}{2}$ per cent of kish, making a total loss of $\frac{3}{4}$ per cent. These ladles are running 40,000 tons of metal to the lining.

Another plant using four 60-ton Pugh ladles gets its molten pig iron from a separate company. Scrap loss is believed to be less with these ladles, but the independent source of iron makes it difficult to get hot metal at

all times when wanted. It is impossible, under these conditions, to mix irons of different analyses. In this case the silicon limits are from 0.80 to 1.30 per cent. The belief was expressed that the Pugh ladle is ideal for small tonnages.

Cost of a 650-ton mixer in 1916 was reported by one operating man at \$160,000. This did not include the building or the cranes. In another case a 600-ton mixer was installed for \$150,000, including the building. No crane was installed, as the arrange-



ARRANGE-
MENT of
Automatic Tongs
with Auxiliary
Loops and Extra
Bits

ment was such that the open-hearth crane could cover the mixer also.

Value of Automatic Couplers

AUTOMATIC couplers have been installed in some of the plants because of their greater safety in operation, compared with the open link and pin. This applies to both charging buggies and ingot cars. Some plants have used the automatic couplings from the beginning. Usually these are smaller than the standard railroad size. In one case where the

scrap charged is light, and there is a great deal of switching and use of the buggies, the couplers are practically necessary in getting the work done.

Another plant, however, reported having gone back to the use of links and pins, after having used a number of cars some years ago with couplers on them. It was found that the two types would not work well together.

In another plant where the links gave some trouble it was found that they were too long. The difficulty was overcome by use of shorter links. With automatic links on ingot cars, it is customary to lay a wooden block across the couplers to take care of the possibility of trouble from a running stopper.

Use of Automatic Tongs

SEVERAL plants reported using one form or another of automatic tongs, similar to those used on a stripper, for picking up both ingots and molds. In some cases a special crane hook is employed which has both the sharp bits for handling ingots and loops for picking up molds by the ears.

This equipment has been found available for setting the molds on the ground as the ingots are stripped, for turning molds over to clean them and then for setting them back on the stools. This device saves a lot of labor in handling both molds and ingots, but is not fully automatic.

In general, the arrangement will be shown by the sketch. The hook is mounted on a swivel operated by a motor and capable of handling 14,000 lb. The loop for molds sets below the bits used for picking up ingots, and is in the way when ingots are lying flat on the ground. Hence a second pair of bits is inserted at the bottom of the loop, to take care of this emergency. The cable coming down in the center disengages the bits or the loops after they have done their work.

One plant reported that the men would not use automatic tongs, because of the time required to swing them into position. It was felt better to use a helper to put light tongs into place. Another plant, however, stated that the automatic tongs are absolutely essential for handling red-hot ingots which happen to be knocked

over at a point outside the building, where men cannot get close to them.

Best Size Mold for Large Slab Ingots

ANSWERING the question as to the size of mold best suited for making ingots of about 12,000 lb., for rimmed steel, one man reported the use of molds measuring $21\frac{1}{2} \times 40$ in. in section for 14,000-lb ingots. He believes that 80 per cent yield is pretty good practice on these ingots. There is always more or less segregation in rimmed steel, but not enough to cause loss beyond that noted above. These molds have $1\frac{1}{2}$ -in. and 2-in. taper on the two sides, and a corner of $1\frac{1}{2}$ -in. radius.

Another plant making ingots of 14,500 lb. uses molds of 21×44 in. The ingots are very heavily cropped and no more segregation is obtained than in ordinary practice.

Corrugated ingots came up for attention, one speaker reporting the use of 22×24 -in. molds for this purpose, with $1\frac{3}{16}$ -in. corrugations. He said that these ingots clean up much better than those with flat sides and that they are free from cracks.

This was at variance with a report privately made from another source, in which the opinion was expressed very forcibly that cracks and seams are both almost sure to be present in corrugated ingots. They were said to follow the line of angularity between corrugations.

Furnace Control Equipment

ONE of the most important subjects before the open-hearth superintendent today is that of proper control of combustion. The plant represented by one speaker has only one furnace fitted with automatic equipment. He believes, however, that the operating men on the other furnaces have been helped by the experience obtained in this one case.

Proper amount of air for the fuel burned cuts the cost of operation and results in better steel. No guesswork need be employed with a furnace properly balanced. It is essential to have a fan to supply the air and this should be driven by a variable-speed motor. Under these conditions, analyses for CO_2 show that there is very little excess oxygen present.

This method of operation reduces the fuel consumption and, with less excess air, there is much less waste gas, less scouring of the outgoing end of the furnace by the outgoing gases and a better furnace life. A stack damper works automatically in connection with the air supply to balance the condition in the furnace.

Waste gas analyses are made for O, for CO and CO_2 . The samples are taken from the furnace downtakes and the oxygen runs under 1 per cent, after the charging doors have been closed.

In a castings plant considerable auxiliary equipment was reported. An oil indicator gives the number of

gallons burned each hour. This runs about 125 during the melting period and 95 while refining. There is also a recording gage with a 24-hr. chart. As the results are always visible to the operating men, there naturally follows a certain competition for low oil consumption between operators of different furnaces.

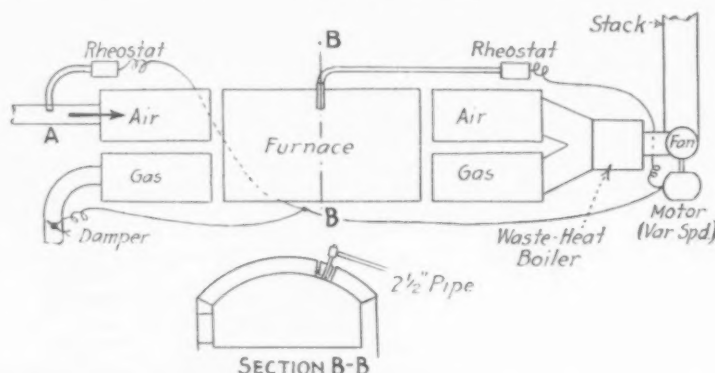
At the base of the stack the draft runs between 0.3 and 0.4 in. of water. A fan blows the air in and produces a balanced condition. A pyrometer records the stack-base temperature at about 1100 deg.

Some 12 per cent of CO_2 is found at the outgoing end of the regenerator. This is believed to be the wrong place for taking these samples, as

creasing weekly production by about 10 per cent.

In the diagram is shown schematically the way this equipment is hooked up. All that is necessary after the controls have once been worked out and properly set is to change the amount of air coming into the furnace at A. The interconnection adjusts all the other elements for proper combustion control. The adjustment in each case is through a rheostat, balanced with a weight, to govern the operating motor.

With this equipment is a master controller consisting of a panel board with several mercury gages on it. Air pressure above the gages is connected with the various controls to the dam-



Schematic Representation of Furnace and Regenerators, with Control Apparatus. A change at A follows automatically through the system

they should be obtained from the downtake.

An air meter shows that 3200 to 3300 cu. ft. is used a minute on 8 to 10 Baumé oil, registering about 155,000 B.t.u. to the gallon. Oil consumption runs as low as 25 gal. to the net ton of charge, using cold metal. This is on a 25-ton basic furnace. An average of 26 heats showed 27.4 gal. to the ton, in place of 35 to 38 gal. used before the regulating equipment was installed.

This furnace is insulated and covered with steel plate, so that it is air-tight. Since the change was made it has been producing about 26 heats a week, against 24 previously.

Cost of instruments and their installation to give the results above outlined was placed by one speaker at about \$3,500. Another man reported no benefit observed in using these instruments, compared with similar furnaces without them.

Mixing Two Dissimilar Gases

INSTALLATION of special combustion control equipment in a furnace in eastern Pennsylvania was reported by one speaker, in which a mixing device for blast furnace and coke oven gas has been adjusted to give a constant value of about 500 B.t.u. to the cubic foot. By volume the range of this system is up to 10 or 12 to 1 without changing the ratio between the two gases burned.

To equip one furnace costs about \$6,000 to \$7,000 for instruments and another \$4,000 to make the installation. However, this results in in-

pers. Below this board is a master wheel to work all of the mercury gages at once, after they have been properly set individually.

Another speaker reported using equipment for keeping the regenerator chambers in balance with each other. The maximum-temperature method is employed, as in the Isley furnace control. When this temperature has been reached a bell rings and a light flashes, notifying the operator that the furnace should be reversed. With this system the difference between outgoing and incoming temperatures is about 85 deg.

Control Usually Advantageous

Local problems account for many differences in practice. One speaker reported, however, that in most cases something is to be gained by mechanical control. The effort is to get apparatus which is so nearly fool-proof that the operations will be carried out exactly as the engineers desire.

The first step is to equip furnaces with instruments for automatic combustion control. Air supply, draft conditions and fuel must be cared for. Different plants making differing qualities of steel give varying requirements. As the men learn to use their instruments control can be taken away from the human factor.

One operator believes that balanced reversals do not necessarily balance the length of the flame. For this a flow-meter balance is required.

Two speakers reported the need of an oxidizing atmosphere in melting

down the charge. This produces an oxide of iron used later in reducing the bath. For the refining period, however, as well as for the lime boil, a neutral atmosphere is needed, or even a reducing atmosphere toward the end of refining, with the air practically shut off.

Indicating and recording instruments are reported to be giving good results on a 100-ton furnace started last May. They have helped the operators to maintain more uniform conditions. Fuel and air are so tied together that a satisfactory furnace atmosphere can always be had. The fuel is adjusted until the flue gas analysis is correct and then held there.

Combustion and Its Control

REPORT of the Combustion Committee was read by its chairman, Charles H. Moreland, of the Wheeling Steel Co. The report consisted mainly of extracts from letters received by the committee from the various plants where study has been under way.

Experiments in one plant in which one furnace is using a combination of coke oven and blast furnace gas have been inconclusive, as the management is not satisfied with present results.

On some oil furnaces, which have not had a complete rebuilding in 15 years, one unit made 732 heats and then required only 12 rows of checkers to be taken out. These furnaces are operating with waste-heat boilers. Steam at 130 lb. is used for atomizing. The oil is heated to 160 to 190 deg. Fahr., and with a pressure of 175 lb. The average consumption for the first nine months of 1929 was 47.9 gal. to the ton of ingots.

Sharp Reduction in Fuel Used

A steel castings plant, using oil of 145,000 B.t.u. to the gallon, reported a consumption of about 70 gal. to the gross ton of castings shipped. This represents approximately 10,150,000 B.t.u. to the ton. A definite campaign to reduce this consumption brought it down by about 20 per cent, going to 8,000,000 B.t.u., with no expense whatever for new equipment.

Changes which were made included going from a long, reducing flame to a short, oxidizing flame. There was a reduction in refractory costs and a smaller deposit in the slag pockets. Under these conditions there was a draft of about 0.75 in., leaving the furnace just about to blow out at the doors. The temperature at the outlet at the regenerator chambers was 1350 to 1400 deg. Fahr. On reducing this draft to 0.65 in., the temperature just mentioned went down to 1200 deg. and the fuel consumption was considerably reduced. Lowering the draft still further to 0.53 in., the fuel consumption was brought down to 41.6 gal. to the ton of charge.

Another furnace using producer gas, with a sloping backwall, reported consumption of 470 lb. of coal to the ton of ingots. This is the

average from five furnaces using Venturi-type ports. Mechanical agitators in the producer plant were reported as giving much better gas than could be had with hand poking.

Another plant which has ten 75-ton furnaces, but is tapping 62-ton heats is using about 545 lb. of coal, or 7,250,000 B.t.u., for each ton of ingots.

Report on Furnace Design

DESIGN of furnaces according to latest practice was reported upon by G. D. Tranter, American Rolling Mill Co., Middletown, Ohio, as a result of answers to specific questions sent to various plants. It was found, on analyzing the answers, that local conditions in different plants require certain modifications of any general schedule.

Hearth areas were reported to vary from 4.5 to 6.75 sq. ft. for each ton of bath content. These baths range from 27 to 34 in. deep. Roofs vary in thickness from 12 to 18 in. There seems to be a movement toward the more general use of 15-in. roofs with 18-in. ribs at intervals across them.

Adjusting Flow of Burning Gases

Combustion control in furnaces is obtained by setting of the port nose in relation to the position of the knuckles. Water cooling is usual for producer gas ports, but is less common with other fuels.

Air uptakes seem to range for producer gas from 30 to 40 sq. ft. in sectional area, and gas uptakes from 8 to 12 sq. ft. This same total area, when oil is used, is put into a single uptake for the air.

Slag pockets for producer gas are now being made from 6 to 7 ft. in width in front of each regenerator chamber. For oil, a single slag pocket at each end of the furnace is made 10 to 12 ft. wide. The regenerator openings vary all the way from 4½ x 4½ in. to 10½ in. square.

Organization of a Working Force

NO standard working force can be offered for different plants on account of the difference in quality of steel made. High-quality alloy steel takes a considerably larger force for its production than the grades more commonly demanded.

As to a wage basis, however, a definite suggestion was offered by the Committee on Organization and reported by its chairman, H. B. Hubbard, Inland Steel Co., Indiana Harbor. Working it out on the basis of a shop containing 12 furnaces, there would be naturally two groups, each of six furnaces with its own set of melters.

Different Types of Bonus Payment

Salary for the foreman or melter would constitute one-half, approximately, of his earnings. A tonnage bonus for increase of production would constitute about one-half of the remainder, while the rest would be

provided as a bonus for economy of operation and quality of product. Working conditions would affect both of the bonus figures so that the proportions, month by month, would not be uniform. These bonuses might be paid monthly or semi-monthly, or on the results of a complete furnace campaign.

For the first and second helpers, day wages would constitute the greater portion of the remuneration. A certain percentage here should be paid on the bonus basis, but it would be a much smaller proportion than for the melter. All other men in the open-hearth department would be paid a day rate, plus a bonus, the latter being a small proportion only of the total income.

Tonnage Basis in Large Use

In discussing this report one company reported that all men in its plant are paid on a combination of hourly and tonnage rates, about half being under each category. In another plant the operating men are paid on a straight tonnage basis, with a bonus for extra tonnage above a certain stipulated amount. The melter, however, has a definite monthly salary, on top of which a bonus is paid. This gives him a decent income, even under poor operating conditions.

Bonus on the life of the furnace roof is paid to the first helper in another plant, in which a tonnage-hour rate is the usual method of payment for both the melter and the first helper. Another plant pays the melter a combination salary and tonnage rate, of which the latter constitutes about 60 per cent of the total. In this plant the first helper and other furnace men are paid a tonnage rate only.

Great Need for Fundamental Research

IN conjunction with the Chicago division of the American Institute of Mining and Metallurgical Engineers, the Open-Hearth Committee held a dinner meeting at the Chicago Engineers' Club on Nov. 6.

After Dr. H. Foster Bain, secretary of the institute, had paid a tribute to metals and their predominant use as a distinguishing differential between the civilized man of the present and the primitive man of the past and of some lands at present, the speaker of the evening was introduced. This was Wilford P. Sykes, assistant general superintendent of the Inland Steel Co.

Mr. Sykes made a particular plea for appreciation of the need of research into fundamental principles. Especially he called attention to the fact that it is difficult to get management to take a long-sighted view of this matter. He stated that we shall make little progress toward better quality in steel making until we have technical men running the furnaces. While "the man at the fire" has done excellent work, he cannot be depended

upon for the finer refinements necessitated by modern demands.

Steel Maker Not Always to Blame

Relations of the open-hearth department to the other departments were brought out rather forcibly by Mr. Sykes in the first part of his talk. This had to do with the blast furnace operations and the coke ovens and, on the other side, with the blooming and finishing mills. Coke is not always good. Although the blast furnace man may complain about it, little is gained unless we can get tests of coke quality which can be made simply and quickly.

When it comes to the blast furnace, there are great variations of unknown origin in the iron, not only from one cast to the next, but between different portions of a single cast. The silicon may vary as much as $\frac{1}{2}$ per cent in one cast. It has become known that the silicon-temperature curve does not hold good in ordinary practice. The open-hearth man should know more than he does about the quality of his pig iron.

In-Breeding of Scrap Not Desirable

There are large and unknown variables in the quality of scrap. If scrap is used over and over again it becomes a sort of in-breeding process, with resulting poor quality in the steel. A prominent English metallurgist claims that all heats of steel should be made with at least 70 per cent of virgin metal.

We may have to spend a much greater amount of money and time in segregating and classifying scrap before charging. This, however, will not be a total loss, as there will be heavy saving in chipping costs to offset this.

Slag Research Urgently Needed

We must learn much more about the properties of open-hearth slags. They are exceedingly complex mixtures of chemical materials and a comprehensive research is beyond the means of the average open-hearth laboratory. Such a task can be undertaken only by large research departments, such as those of the United States Steel Corporation, the Bureau of Mines, or the Bureau of Standards. This will cost a great deal and will take a long time; a ten-year program is not beyond reasonable expectations. It is a matter of great magnitude and requires scientific research of the highest quality.

We must have better tools to aid the melter in his work. One of these tools consists in rapid tests whereby he can learn quickly just what his bath is doing. This will reduce his guesswork on the basis of a fractured test-piece to a minimum. The effect of the temperature of steel when it is tapped is something about which we should know more. It will be necessary to get away from guessing at this temperature, through using pyrometers more generally. The eye is an uncertain temperature guide.

Handling of hot steel in soaking

pits may cause grave defects in the finished product. Often these are blamed upon the open-hearth department in its making of the steel. Until we have more information as to how these defects are initiated, we shall have no uniformity of opinion as to what is good heating practice.

Rolling is largely a question of surface condition. The center of the ingot is pulled along by the outside under a definite but unknown tension. If the rolling is carried too far on one side of the ingot, this may cause defects which show up in the finished steel. It is bad practice to spread ingots, in rolling, to greater widths, as this often sets up seams or cracks.

At the Witkowitz plant in Czechoslovakia 10,000 steel plates from 380 heats of steel were analyzed. They showed a considerable quantity of snakes which were mainly caused, it was found, in heating, slabbing, reheating and finishing. The open-hearth department was responsible for very few of them.

User and Maker Should Work Together

Cooperation between the user of steel and its maker will help in obtaining the quality required. At present this cooperation, so far as any effective degree is concerned, is confined mostly to the grades of steel used in the automotive industry. If the steel man knows what the steel is to be used for, he often can work to the desired quality. Without this knowledge, and working from specifications written by metallurgists lacking knowledge of the steel man's problems, the specification may be met but the steel will not necessarily be just what was wanted.

One phase of the matter has had practically no attention. That is a proper statistical analysis and correlation of the results of experience and tests. It may be that the large laboratory of the future will employ competent statisticians to do this very thing. This ought to bring out factors which now we largely overlook.

Visit to Laclede Steel Co.

MORE than 30 of the men at the meeting were carried from Chicago to Alton, Ill., Wednesday night, in two special Pullmans, which were switched into the yard of the Laclede Steel Co. to a position near the open-hearth department. Breakfast and luncheon were served by the company. The visit was for the express purpose of inspecting the new 100-ton open-hearth furnace at that plant, built to the designs of the Arthur L. Stevens Corporation, Chicago. Owing to ladle limitations, the heats being tapped out of this furnace are somewhat below its rating.

Principal among the features is the control of the fuel and the air for its combustion. Once set, the ratio between air and oil is maintained at a constant figure, however much of a flame the operator may carry on his furnace. He has a certain amount of latitude with regard to this ratio, to

take care of varying qualities of oil. Customarily, however, this factor can be ignored. The flame breaks at the center door.

How the Fuel Is Burned

Oil is used at a pressure of 50 lb. at the burner, and heated to 160 deg. Fahr. It is atomized by super-heated steam at a temperature of 480 deg. and a pressure at the furnace of 100 lb. The oil used is from 8 to 12 gravity and consumption is reported at about 27 gal. to the gross ton of ingots.

The furnace atmosphere is so well balanced that the draft gages for both ends of the furnace were reading about 0.07 in. of water, negative pressure. A by-pass air valve with a butterfly valve operates to open up a passage to the stack whenever the stack draft becomes too great. This is continually changing its position slightly, to maintain the draft balance automatically.

This furnace has a bath 14 ft. wide and 36 ft. long at the slag line, and with 27-in. depth from the beginning of the taphole to the metal line. The roof is straight from end to end. The charge is running about 220,000 lb., all cold, to which is added 6800 lb. of burnt lime.

Even Control Easy on Roof

Refractories are running about 1190 lb. of dolomite and 800 lb. of Granite. More than 350 heats have been taken out of this furnace, averaging 10 hr. 24 min. each. Most of the speed is gained during the melting period. It is expected that this run will reach 60,000 tons of ingots. The roof is still in excellent condition, having had one hot patch above the taphole. A new front wall was put in at 27,000 tons.

The regenerator chambers are insulated with $4\frac{1}{2}$ in. of Sil-o-ceil brick and encased in steel plate, thus shutting off all infiltration of air. There are 39 courses of checker brick measuring $13\frac{1}{2} \times 6 \times 3$ in. The checkers are running at a good white heat, and are reported to be fairly clear of sediment, and there is a very small quantity of slag—about 6 in.—in the slag pockets.

Reversing is manual on a schedule of about 22 min. Record of the reversals is made on a recording instrument, while the temperature gradient in the regenerators is recorded on another Leeds & Northrup instrument.

The superheater for the steam consists, for this furnace, in coils within a drum between the regenerators and the stack. The temperature at this point is about 1100 deg. Fahr. A somewhat different type of superheater is employed in the three other furnaces. Each has a group of bent tubes inserted into the flue itself, and receiving heat as the gases pass through on the way to the stack. This arrangement is reported to give better results than the one on the Stevens furnace.

[More of the technical discussion of the meetings will be published next week.—EDITOR.]

Furnace Cooled by Double Auxiliary

Air is Circulated in Built-In Pipes—Further Cooling by Air Blast Through Chamber

BY R. E. COX*

DEMAND for quick turn-over of material in conjunction with modern production methods has necessitated annealing furnaces having variable but controllable heating and cooling cycles. A furnace meeting these conditions yet maintaining high thermal efficiency has been designed, and several are now under construction. It is heated electrically and the design embodies the following features:

1. Even and efficient heating at such a rate as may be desired in the process.
2. Cooling periods either short or long controlled by the operator according to the method desired in the process.
3. Fast cooling without expensive honeycomb wall construction and without air in contact with work, thereby eliminating oxidation and decarburization.
4. A first grade product in a very short time with unusual economies per ton of material.

Even and efficient heating is accomplished by several points in furnace construction which lend themselves to fine temperature control. The furnace is heated electrically, an exceptionally good type of heat because the units are so distributed as to give uniform and even temperature throughout the furnace. It insures against hot spots and cold drafts and lends itself readily to close control. There are no flues or gas

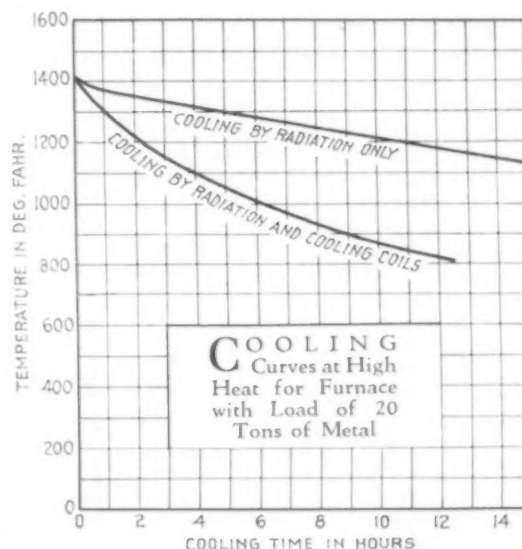
vents through which unnecessary air is admitted or heat lost. The furnace is sealed air-tight during the heating period.

Walls of the furnace are insulated like those being operated continuously at higher temperature. In most furnaces where a rapid cooling cycle is used the furnace walls are under-insulated; this aids cooling, yet gives the inevitable low economy during the heating cycle. With the present arrangement the walls are fully insulated, thus insuring high efficiency and economy of the heating cycle, and the standby losses of the furnace are cut to a minimum.

To reduce the heat capacity of the furnace structure, the chamber is lined with lightweight semi-refractory brick, allowing the walls to heat or cool very quickly, in nearly half the time consumed by ordinary refractories. Much flexibility to the heating and cooling cycle is thus secured and the furnace economy increased.

Adjustable cooling cycles are accomplished by cooling coils and an auxiliary ventilating system, the latter controlled by blast gates sealed tight by insulated doors during the heating period. The cooling coils consist of seamless alloy tubing, formed to allow for expansion and generally

installed in the top of the furnace chamber. These coils may, however, be installed in the sides or bottom or both, according to the particular conditions. The tubes are so installed that both ends protrude through the furnace; the inlet end of each tube is connected to a header which in turn is connected to a blower. The outlet end is open to exhaust to the outside air. Thus none of this cooling air enters the furnace chamber. Rate of cooling can be controlled by the amount of air blown through the pipes and by the number of pipes per furnace.

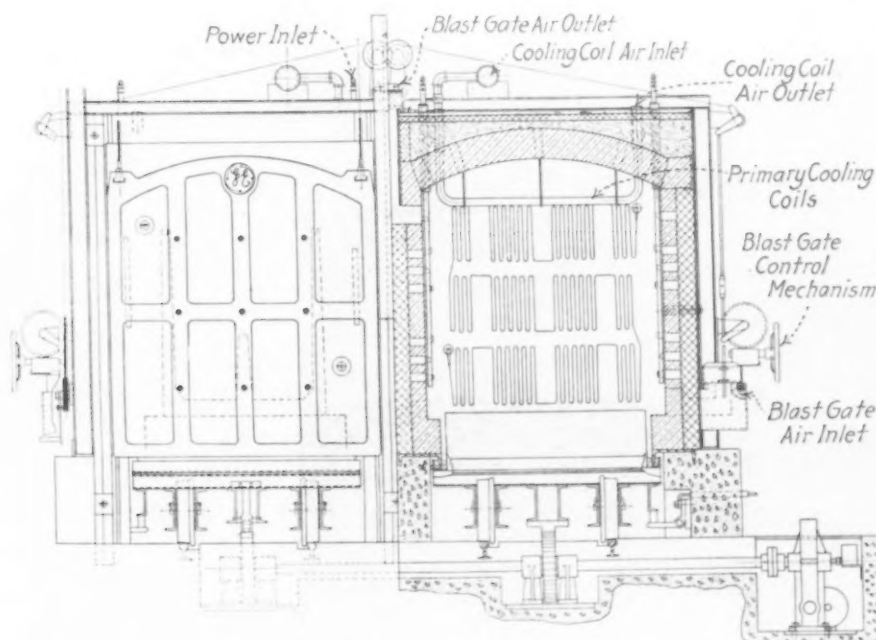


Fast cooling without oxidation or decarburization of the hot metal in the furnace is accomplished by using the cooling coils until the temperature of the load is reduced to about 900 deg. Fahr. Supplementary blast gates are then opened and the load is cooled swiftly to room temperature or to such a temperature that the material can be easily handled.

This supplementary system for rapid cooling in the non-scaling range comprises ventilation holes in the sides of the furnace near the bottom and in the roof. These holes are fitted with insulated covers seated in a sand seal. When closed they prevent heat leakage during the heating cycle and insure a thoroughly tight furnace. These covers or "blast gates" are operated through a system of levers and reduction gears by a hand wheel. This gives a single point control which can be installed at an easily accessible place on the furnace and assures the operator of the exact position of the covers at all times. When set for rapid cooling the outside air enters through the bottom holes, passes through the furnace chamber and out the top holes, the covers being in a raised position.

No special honeycomb wall construction is necessary with this design and, therefore, no complicated repair jobs are necessary.

Of course, the furnace may be left to cool by itself without using either coils or blast gates, but owing to the thickly insulated walls, this would



SECTIONAL Elevation of Double Furnace with Pipe Coolers for High Heat and Air Blast for Low Heat

*Industrial Heating Engineering Department, General Electric Co., Schenectady, N. Y.

require a very long period, as is shown by the curves.

The most interesting features to the manufacturer are doubtless unusual economy per ton of material, fast treating time, and a high grade product.

All the above is made possible by first, a scientific analysis of the steel to determine the best possible heating and cooling cycle, and second, a proper adjustment of the furnace, as described in this article, to the cycle desired.

boxes or other packages with flat surfaces, and having sufficient length and width, the opening, as shown in the illustration, will not cause any difficulties in handling the material. Guides at the turning points serve to carry the load around the corners without spillage or piling up.

This equipment was designed and built and put into operation by Mechanical Handling Systems, Inc., Detroit.

Slat Conveyor to Turn Corners

Special Design for Use in Constricted Quarters—Handles Tote-Boxes of Materials

WHILE the slat conveyor is a type of equipment which has been in use for many years in handling materials along a straight run, it is an innovation to use that type in turning a sharp or right-angle corner. Such a device, however, has been put into use, as is here illustrated, in a plant manufacturing springs for upholstery purposes. As will be noted, the inner corners of the slats are cut away so that they may have clearance for making the turn.

Previously the work which this conveyor does would have been performed by two separate straight-line conveyors at right angles to each other, the one discharging upon the other. There has, however, been considerable difficulty and annoyance at transfer points of this type.

Taking Off the Corners of the Slat

Hence the idea was conceived, which has taken form in the new equipment, of beveling the slats at one end or at both ends. Instead of carrying them on two strands of chain, requiring both stands to have exactly the same distance to travel from one end to the other, the slats are attached here to a single strand of chain. Attachment is made near the center of the slat and the chain

is carried in a vertical plane, with its pins up and down instead of crosswise.

This arrangement permits the slats to be carried around corners in their normal horizontal plane, and at the same time passes the chain over sprocket wheels with vertical axes, or over a series of rollers, permitting a curved path of any desired radius and to any angle which may be necessary.

In this manner the packages may be carried along a path of any amount of crookedness required by conditions, and, if desired, the circuit may be a closed one. A rectangular conveyor might run through a stockroom, going through or passing various bins, and come back to its starting point. An empty pan put on at one point would pass the bins and be loaded, and then returned to the same point where it was put on, filled with the parts necessary to take care of any required orders.

Openings Between Slat Ends Do Not Harm

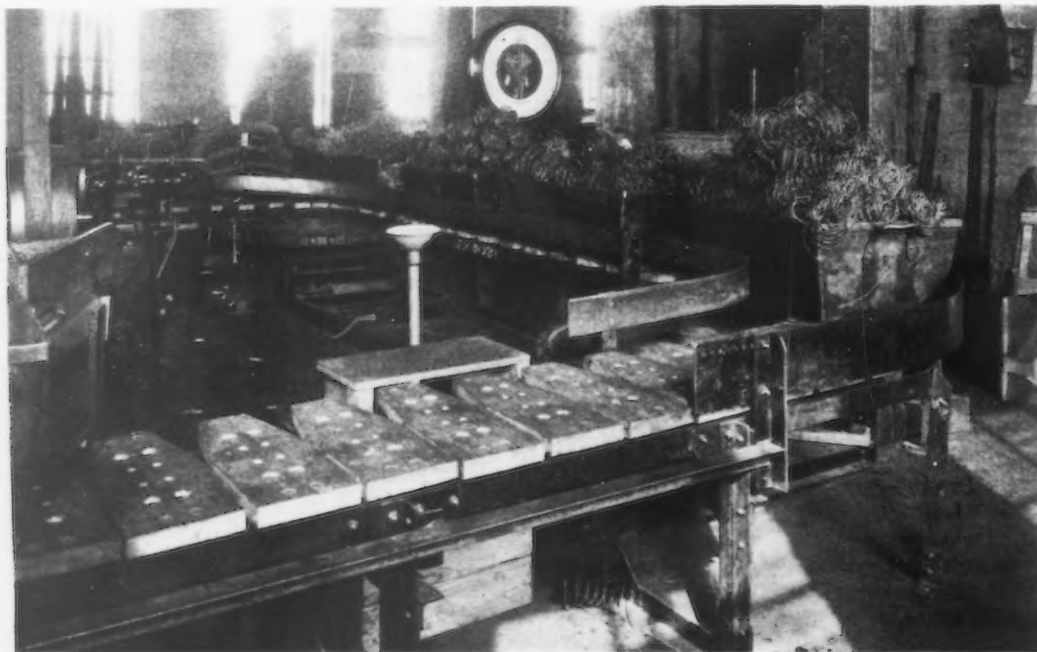
It is obvious that the surface of this conveyor is not so solid or unbroken as in the case of a straight conveyor. With the latter the slats may be separated by as little as $\frac{1}{8}$ in. However, for handling tote-pans,

New Machine to Polish Metal Specimens

METAL crystals are sometimes large enough to be seen with the unaided eye, but ordinarily they are so small that a microscope is required. Before the metal can be examined under the microscope it must be polished. This, with the hand methods ordinarily used, is a tedious task and requires long experience. It is important, in polishing metals for this purpose, that no pitting occur, since any pits thus produced may be mistaken for defects in the metal.

An automatic machine for polishing metal specimens for microscopic examination has been developed at the United States Bureau of Standards. The machine was designed primarily for use in a study of polishing methods, so as to get reproducible results free from human equation errors. It produces a high-grade polish and should prove of great value in metallographic laboratories.

Polishing is done on revolving cloth-covered disks with alundum powders and aluminum or magnesium oxide as abrasives. In the machine three specimens are polished on one disk so that with, say, three disks, nine can be polished at a time. When a large number of specimens have to be polished, a considerable saving of time compared with hand polishing can thus be obtained.



BY Cutting Away the Inner Corners of the Slat, a Flat Slat Conveyor May Be Made to Go Around a Corner of Any Desired Radius or Angle

New Shaper-Planer

Hydraulically-Actuated Table Drive and Feeds Provide Smooth and Rapid Operation

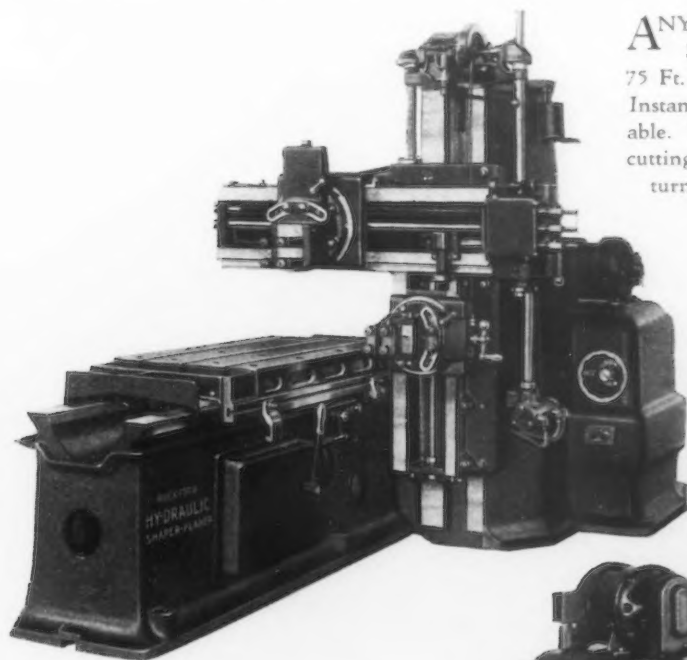
IN the new shaper-planer recently brought out by the Rockford Machine Tool Co., Rockford, Ill., both the table and the feeds are hydraulically actuated. Compared to the previous design, the new machine has greater power, rigidity and work capacity, as well as finger-tip convenience of control, and exact adjustment of speeds and feeds to suit the requirements of the work.

An Oilgear pump operates a hydraulic cylinder mounted in the bed

cross shafts and working parts from the interior of the bed, permitting it to be extra heavy in section and reinforced to withstand the heaviest loads. The ways are scraped to gages and are lubricated by filtered oil under pressure.

The column is keyed and bolted rigidly to the bed. The crossrail is L-shaped with long vertical bearing and narrow guide fitted and gibbed to the front face of the column. The side head and its rail are adjustably

ANY Cutting Speed Up to 75 Ft. per Min. Is Instantly Available. The ratio of cutting speed to return is 1 to 3



close up under the table. The piston of this cylinder is connected directly to the table and exerts a maximum pull of 10,800 lb. Any cutting speed desired, up to 75 ft. per min. is instantly available, and the ratio of cutting speed to return is 1 to 3. Table reversal is smooth and shockless.

Hydraulic power for the feeds is provided by a separate pump. There are 20 horizontal feeds, ranging from 0.010 to 0.200 in., and an equal number of vertical feeds, ranging from 0.004 to 0.080 in. Feed takes place after the table returns and before the cut starts. The table and feed pumps, with the pump that supplies oil to the ways, are inclosed in a housing at the rear of the machine, and are accessible through a large door.

Power for raising and lowering the counterbalanced rail and for rapid traversing the head in either direction is supplied by a small motor at the top of the column. Interlocking mechanisms, automatic trips, and shear pins serve to protect the machine against damage. Centralized, sensitive and accurate control is a feature emphasized as contributing to increased productiveness.

The hydraulic table drive removes

mounted on the front of this vertical section. A sturdy box-section brace is bolted and doweled to the crossrail; it reaches back to the rear of the column where it may be clamped on an accurately machined surface. Both rail and side heads are of graduated swiveling type, provided with tapered gibs. The rail head has horizontal and vertical power feeds in both directions, and rapid traverse to the right or left. The side head has vertical power feed and hand horizontal feed.

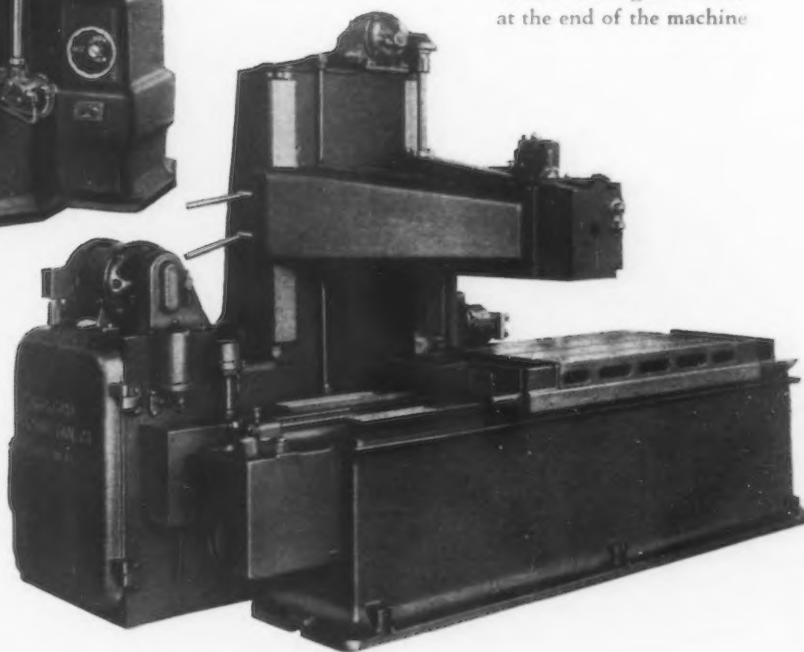
By mounting a grinding head on the crossrail, a reversing cam on the table, and making two simple adjustments the machine may be used for accurate surface grinding. Provision

is made for the protection of all finished surfaces on the machine. The table speed, approximately the same in both directions, is correct for surface grinding, and the feed takes place at both ends of the stroke.

Extra equipment available for the machine includes a second rail head, side head, circular planing head, boom crane, shoe and wedge chuck, and driving rod brass planing fixture.

The stroke of table of the standard machine (42 in.) is 43 in., while that of the 66-in. machine is 67 in., and of the 90-in. machine, 91 in. The length of the table is 54, 78 and 102 in., respectively, and the width of table of all machines is 24 in. The maximum distance from table to crossrail is 24 in. Floor space occupied by the 42-in. machine is 58% x 119 in., the maximum height is 101 in. The

THE Hydraulic Drives Permit Simplified and Heavier Construction. The three pumps are accessible through the door at the end of the machine



weight of the standard machine, 42-in., with side head but without motor, is approximately 14,000 lb.

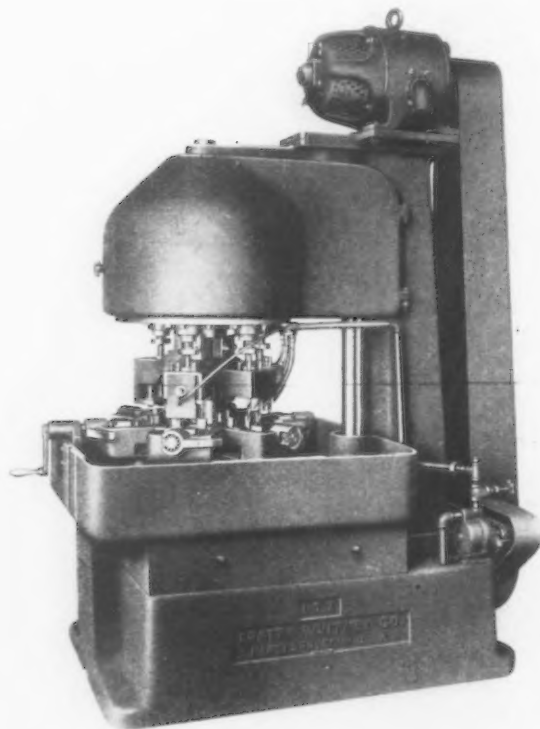
Correct installation and maintenance of lathes are described and illustrated in a 20-page booklet issued by the Monarch Machine Tool Co., Sidney, Ohio. Subjects include methods of leveling, care and lubrication of the apron and the headstock, adjustment of the driving clutch and motor belts and chain, adjustment of the spindle, and the proper method of changing spindle speeds. A page is devoted to questions and answers to various unusual problems of lathe operation.

Six-Station Vertical Automatic

Adapted for Wide Variety of Work—Operations Speeded by Use of Multiple-Cutting Tools

A SIX-STATION five-operation vertical automatic for high production and long runs of a variety of work is being marketed by the Pratt & Whitney Co., Hartford. Operations performed include milling, drilling, sawing, facing, threading, tapping, hollow milling, reaming, serrating,

box supplies oil to the head, which is arranged to supply a drip oil feed to the spindle drive mechanism and the work tables. The same pump also supplies oil for the table driving parts. The only oiling attention required is filling the large gear box reservoir in the bed and the oil cup on each idler



(Left) The Vertical Automatic May Be Used for Quantity Machining of Valve Stems, Guide Bushings, Bibb Stems, Spark Plugs, Small Shafts and Numerous Other Parts. The work is advanced and withdrawn from the tools by cam action

* * *

(Right) Control of the Furnace Atmosphere Prevents Pitting and Scaling of Material Being Heat Treated

knurling and boring. Parts to be machined can have holes off center and various machining operations on different center lines can be finished at the same set-up. In addition to flexibility, simplicity of operation is a feature, the only duty of the operator being to load and unload the work and keep the cutting tools in condition.

The machine is designed for individual motor drive, with full electrical equipment, including push-button control. A 7½-hp. 1150-r.p.m. motor mounted on top of the column is belted to the drive pulley at the rear of the bed. From the gear box in the bed, power is transmitted to the spindles through a large vertical shaft in front of the column, and a set of change gears in the head. From the gear box the power is also transmitted through a clutch and a worm-wheel to the table mechanism. By means of the two sets of change gears the speeds of the spindles and the table are controlled separately. A friction clutch operated by foot lever stops the movement of the table without stopping the spindle.

Completely inclosed, the gears in the gear box run in oil. Filling of the box is from an oiler at the side of the bed. A pump inside of the gear

spindle. Removable covers at the side of the bed give access to the interior mechanism.

The work tables index progressively from one spindle to another and are locked in each position automatically. Vertical movements of the work during cutting are controlled by cams placed on an oscillating ring under the table. These cams move back and forth, each remaining under its particular spindle at all times. The cam followers are rollers on the lower ends of the six work-table elevating spindles, and move progressively from cam to cam as the work advances from spindle to spindle. The cams may be removed and replaced conveniently.

Power from the vertical shaft is taken to the spindles through bevel gearing, and a large central gear meshes with the separate gear trains for each spindle. Each work spindle has an idler spindle carrying compounding gears, which permits the speed of individual spindles to be controlled over a wide range. The spindles are carried in a large circular bracket and are supported rigidly in sleeves mounted in widely spaced ball bearings. Each spindle is threaded its entire length so that the tools it carries

can be positioned vertically and locked in place. During operation the spindles revolve but do not move up and down.

Multiple-cutting tools, such as multiple drill units, combination facing and drilling devices, drills running inside a box mill, etc., can be used on each spindle. Specifications of the machine, which is designated as the No. 2 vertical automatic, are: Maximum distance from flange of work-holding spindle to flange of cutter spindle, with work-holding spindle in lowest position, 14½ in.; maximum travel of work, 3½ in.; maximum adjustment of the cutter spindle, 6½ in.; and maximum work diameter swing, 8½ in. The speed of the cutter spindles, which are independent of each other, ranges from 150 to 1500 r.p.m. Floor space occupied by the automatic is approximately 40 x 74 in., and the height, not including motor, is 81 in. The net weight, without motor and tooling, is 6750 lb.

Atmosphere Controlled in Heating High-Speed Steel

A NEW patented device which controls the furnace atmosphere, thereby preventing the pitting and scaling of metal parts and tools during the heat-treating process, is a feature of the Hayes Gobar electric



furnace which is being manufactured and sold by C. I. Hayes, Inc., Providence, R. I. Furnaces are made in two general types, one for intermittent, light-duty purposes and the other for continuous, heavy-production operation.

One of the most important uses of these furnaces is for heat treating high-speed steel tools. The method of controlling the temperature of the furnace's atmosphere is claimed to involve a new principle, which con-

sists of maintaining an unbroken curtain of burned gases across the furnace opening, forced through a slot in the throat of the furnace between the door and the heating chamber. The volume and mixture of the gases may be controlled to produce the ideal furnace atmosphere, which is neutral or slightly reducing. The curtain of gases, being transparent, does not interfere with the operator's judgment of color. It is maintained under sufficient pressure to prevent admission of air while the furnace is in operation. This permits the use of the furnace with the door open, if desired.

Furnace type HG 22 is of the light-duty or intermittent type with a heat-

ing chamber 3 in. high, 4 in. wide and 12 in. long and has a capacity of 12 kw. Type HG 32, also of the intermittent type, has a heating chamber 4 in. high, 6 in. wide and 12 in. long and a capacity of 16 kw. Types HG 42 to HG 72, five in number, are of the heavy-duty, production types. HG 42 has a heating chamber 4 in. high, 8 in. wide and 12 in. long and a capacity of 20 kw. These dimensions are increased in the other types until in type HG 72 the heating chamber is 12 in. high, 16 in. wide and 30 in. long and the capacity is 60 kw. All furnaces operate on 110 or 220 volts, either alternating or direct current.

it moves the pen to record on the chart the temperature of the thermocouple.

The three chart speeds are $\frac{3}{4}$, $1\frac{1}{2}$ and 3 in. per hr. On operations where temperature changes are slow and long periods of time are involved, the slow speed condenses the record and makes observation of trends and cycles easier. For rapidly fluctuating temperatures and short cycles of operation, the faster speeds allow more detailed analysis of changes.

Being integral, the recording pen and the slide wire contact cannot get out of relationship to each other. The pen has a metal tube siphon that can be cleaned and handled without breaking; the ink reservoir holds a supply sufficient for an entire record roll. The ink employed has a brilliant red color and dries before the chart emerges from the case.

Provision for quickly adjusting the sprocket at one end of the paper roller as to distance from the sprocket at the other end of the roller permits adjustment for variation in the width of the chart paper due to atmospheric conditions.

The external drive unit, consisting of motor and double worm and gear speed reducer located outside the instrument case, is the same as that employed in connection with the company's automatic temperature controllers. It provides ample power for operating more than one instrument, and the arrangement is such that a group of recorders or a group combining this recorder and the company's automatic temperature control pyrometer, can be operated by one drive unit.

Charts are available for a wide selection of scale ranges, in both Fahrenheit and Centigrade. For low temperature operations, from 600 deg. Fahr. to 0 deg. Fahr. or lower, the recorder is supplied to operate as an electric thermometer employing resistance bulbs. The instrument case opens diagonally, making the entire mechanism easily accessible. A storage roll and holder that fits underneath the recorder is available for rolling up and holding the used portion of the chart.

American Steel Foundries reports, for the quarter ended Sept. 30, net profits of \$1,053,842 after Federal taxes and depreciation, compared with \$575,270 in the same period a year ago. Earnings are equivalent to 94c. a share for the 1929 period, as compared with 51c. a share in the corresponding quarter of 1928. Earnings for the nine months to Sept. 30 totaled \$3,856,066, against \$2,430,011 in the corresponding 1928 period.

Unfilled orders of Allis-Chalmers Mfg. Co., West Allis, Wis., on Nov. 1 were \$13,900,000, against \$13,446,000 on Oct. 1, an increase of \$454,000. Unfilled orders Sept. 1 totaled \$14,086,000. On Jan. 1, 1929, order books showed \$9,639,000 of unfilled business.

Recording Pyrometer with Chart 12-In. Wide

USE of a 12-in. wide temperature record chart, automatic electric cold junction compensator, external electric motive power and three different chart speeds are features of a new potentiometer recording pyrometer which has been added to the line of the Wilson-Maeulen Co., 383 Concord Avenue, New York. The unusual

ing in a vertical plane, approach the pointer from each side, exploring for the location of the pointer. If either finger finds the pointer deflected and away from its central or null position, a roller ratchet dog is released by the finger, causing a drum to turn.

By means of a violin string, wound around the drum, passing over pul-

THE Chart Recorder Is Visible as Soon as Made. The pen never lifts from the paper, and, therefore, the record is continuous. Three chart speeds, $\frac{3}{4}$, $1\frac{1}{2}$ and 3 in. per hr., are available to suit heating conditions. The temperature lines and figures are plain, and the record may be read at a distance from the instrument. The electric motor drive is externally located, as shown, and a group of recorders may be operated by one drive unit

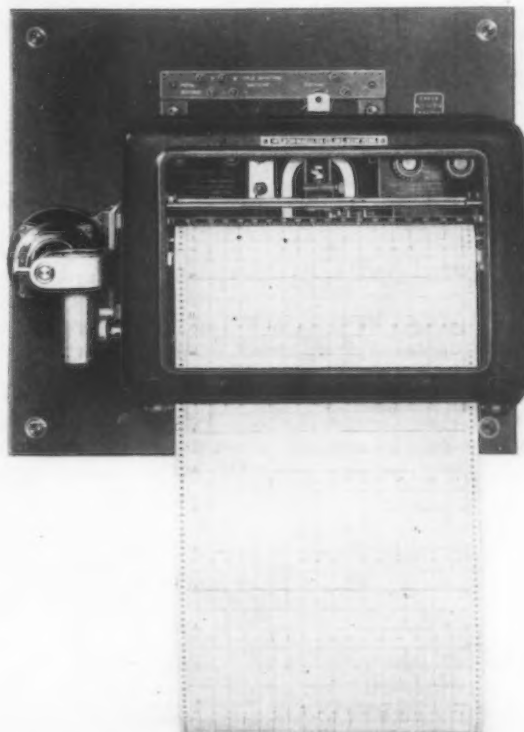
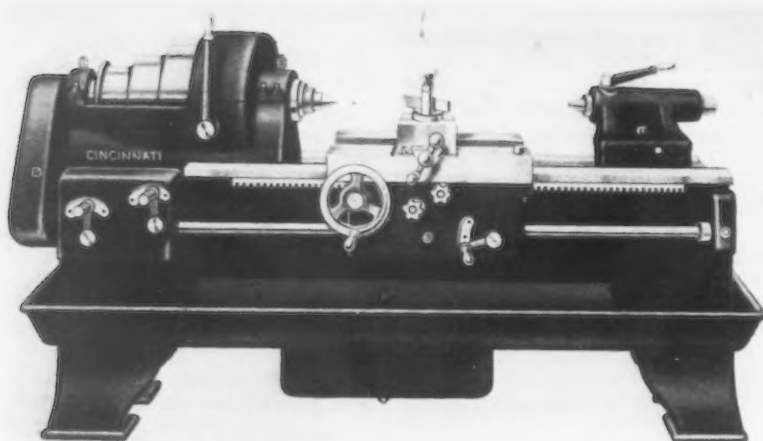


chart width provides openness of scale and more exact readings; with the legible printing in ink of contrasting color it permits readings to be made at a distance from the instrument.

In this instrument, designated as the No. 8201, when the measured voltage from the thermocouple changes as a result of temperature change at the thermocouple, the galvanometer pointer deflects in the corresponding direction. At intervals of 10 sec. a boom descends and grips the pointer firmly, while two sensing fingers, mov-

leys at each side of the chart and attached at opposite sides of a carriage, motion of the drum in either direction is transmitted to the carriage, which is arranged to travel back and forth across the entire instrument. The carriage carries the marking pen, and a contact brush that rides on the potentiometer slide wire. The selective operation of the drum's rotation, both in direction and extent, moves the contact on the slide wire to bring the galvanometer back toward its null or undeflected position; at the same time



New Line of High-Speed Lathes

TO permit economical use of tungsten-carbide cutting tools, the Cincinnati Lathe & Tool Co., Cincinnati, has developed a line of "Maxi-Production" lathes having speeds up to 1000 r.p.m. The machines are built in 17, 19 and 21-in. sizes, with 6-ft. and longer beds.

By operating a lever on the headstock, the spindle is started and stopped instantly through a positive friction clutch and brake, but the cone continues operating until stopped by the countershaft. The headstock is designed to assure adequate strength under severe conditions. The spindle is made from a high-carbon steel forg-

ing, has a 2 $\frac{3}{4}$ -in. hole for barstock, and is mounted in Timken roller bearings. The lathe can be furnished either with or without back-gears.

The tailstock construction permits a wide range of adjustments at different angles of the compound rest. Either a quick-acting or a standard screw feed tailstock can be furnished. The feed box gives a wide range, from very coarse to fine feeds; it may be replaced at any time with the company's quick-change gear unit for screw cutting. A plain rest is provided with the regular equipment, but any of the standard rests or turret attachments can be supplied.

Radial Drill Features Centralized Control

CENTRALIZED control and use of anti-friction bearings throughout are features of new 11-in. and 13-in. radial drills which have been added to the "Mor-Speed" line of the Morris Machine Tool Co., Cincinnati.

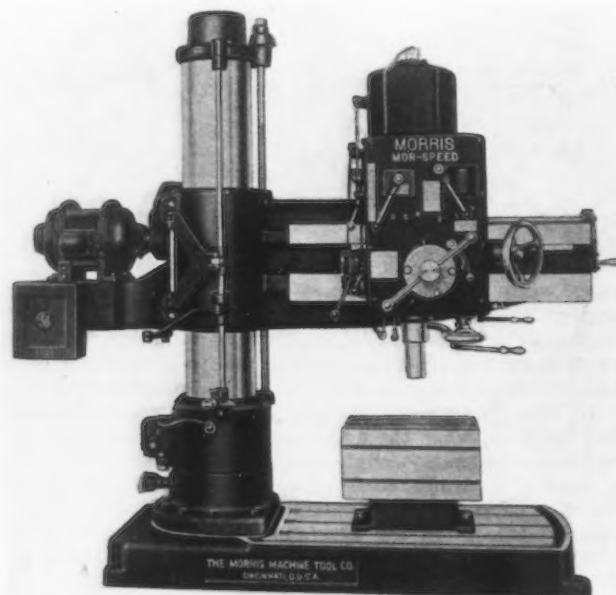
Only one constant-speed motor, mounted on the arm, is employed to drive the entire machine, including the elevating attachment. There are 27 speeds and 12 feeds. All speed and feed changes are located in the head, and changes may be made without leaving the operating position. The column clamp, elevating lever and head clamping lever are within easy reach.

All gears are hardened and have broached keyways, and shafts and spindles are heat treated and multiple splined. There are no loose keys, and clutches, tumbler gears or dive keys are not used in the making of speed and feed changes. The spindle can be started, stopped or reversed instantly at the highest speeds.

The arm is raised, lowered and clamped by means of a single lever. Both inner and outer columns are mounted on radial and thrust ball bearings to facilitate swinging and assure proper alignment. The head is clamped on both sides with one movement. An electrically actuated

head-moving device and column clamp, operated from push buttons on the head, can be furnished. No part of the elevating device is in motion except when actually raising or lowering the arm. It is not necessary to stop or slow down the motor

THE One Motor,
on the Arm,
Drives the Entire
Machine, Including
the Elevating
Attachment.
Twenty-seven
speeds and twelve
feeds are obtain-
able, all speed and
feed changes being
made at the head

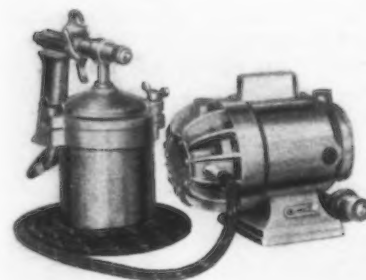


at any time, as the elevating lever is thrown to elevating or lowering position while the motor is running.

All moving parts of the machine are continuously lubricated. The entire head runs in oil, a ball-bearing pump delivering oil to the top of the head through a sight-feed oiler. Other parts are oiled from a central reservoir.

Portable Electric Paint Spray

A NEW electric paint spray machine of the compressor type has been put on the market by the Breuer Electric Mfg. Co., 852 Blackhawk Street, Chicago. The equipment is designed for touch-up work, shading and light finishing and refinishing jobs, as well as semi-production and



maintenance industrial painting work. It has the trade name Tornado.

The sprayer, which is of the rotary compressor type, is built of aluminum castings and driven by a $\frac{1}{2}$ -hp. General Electric motor. The compressor unit weighs 7 lb. and develops a pressure of over 35 lb. to the square inch.

Two tips may be used with the spray-gun, one being slotted for a fan spray and the other a narrow spray. The area covered is from 2 to 14 in. A handy adjusting screw controls the amount of paint to be used. The spray-gun weighs 2 lb. and the container has capacity of 1 quart.

Tariff Bill May Be Killed

Opinion in Washington Is New Measure Will Never Become a Law—Coalition Group in Senate Reduces Pig Iron Duty, Restores Manganese Ore Rate

WASHINGTON, Nov. 12.—Slashing the duty on pig iron to 75c. a gross ton, restoring the duty on manganese ore to 1c. a lb. and making it apply on metallic content in excess of 10 per cent instead of 30 per cent, as in the present law, and making many other changes, the coalition of Democrats and irregular Republicans in the Senate completely dictated the draft of the metal schedule in the tariff bill. Administration forces were helpless, and offered no resistance. The metal

schedule as a result has been greatly changed. The coalition at times had the support of regular Republicans. On the other hand, there were instances where Democrats stood with the Administration forces and went down to defeat with them. It was an exhibition of curious alignments, and difficult to explain, even when political expediency and sectional interest are kept in mind.

The prolonged debate on the metal schedule, begun on Thursday of last

week, became heated at times, particularly during the discussion on manganese ore. The Senate voted to place a duty of 1c. a lb. on the manganese content of 10 per cent or more, thus killing the committee amendment to place manganese ore on the free list and increasing the content range of manganese now dutiable when it grades 30 per cent or higher, a duty that was continued in the House bill. The manganese duty was voted upon an amendment by Sen-

Senate Action on Metal Schedule of Tariff Bill

Senate Bill Paragraph	Rate Adopted by Senate	Reported by Senate Finance Committee	House Bill Rate	Present Rate
301 Pig iron, ton	75c.	\$1.50	\$1.125	\$1.125
301 Spiegeleisen, ton	75c.	\$1.00	75c.	75c.
*214 Sponge iron	30 per cent	\$2 ton	0.3c. lb.	30 per cent
301 Scrap, alloy, and hammer, roll and mill scale, alloy, ton	75c. and 3c. lb. on chromium in excess of 3/10 per cent	75c. and 3c. lb. on chromium in excess of 3/10 per cent	75c. and 4c. lb. on chromium in excess of 2/10 per cent	75c.
302 Manganese ore	1c. lb. in excess of 10 per cent, manganese content	Free	1c. lb. in excess of 30 per cent, manganese content	1c. lb. in excess of 30 per cent, manganese content
302 Tungsten ore, lb., metallic content		45c.	50c.	45c.
302 Ferromanganese, lb. manganese content, more than 1 per cent carbon	1½c.	.65c.	1½c.	1½c.
302 Ferromanganese, spiegel, etc., manganese content, not more than 1 per cent carbon	1½c. and 15 per cent	.65c. lb. and 15 per cent	1½c. lb. and 15 per cent	1½c. lb. and 15 per cent
302 Ferrotungsten, metallic tungsten, etc., per lb. tungsten content		60c. and 25 per cent	60c. and 25 per cent	60c. and 25 per cent
302 Silicon aluminum and aluminum silicon (aluminum not component material of chief value), lb.	3¼c.	3¼c.	5c.	5c. lb.
302 Ferrosilicon aluminum and ferroaluminum silicon (aluminum not component material of chief value)	25 per cent	25 per cent	5c. lb.	5c. lb.
302 Ferrochrome containing 3 per cent or more carbon, chromium content, lb.	2¼c.	2¼c.	3¼c.	3¼c.
302 Ferrochrome containing less than 3 per cent carbon	25 per cent	25 per cent	30 per cent	30 per cent
302 Tantalum	25 per cent	25 per cent	25 per cent	Free
302 Cerium metal, lb.		\$1	\$2	\$2
302 Ferrocerium and all other cerium alloys		\$1 lb. and 25 per cent	\$2 lb. and 25 per cent	\$2 lb. and 25 per cent
302 Ductile columbium or niobium metal	40 per cent	40 per cent	25 per cent	25 per cent
305 Vanadium steel or iron	8 per cent plus \$1 lb. contained vanadium in excess of 1/10 per cent	8 per cent plus \$1 lb. contained vanadium in excess of 1/10 per cent	8 per cent plus \$1 lb. contained vanadium in excess of 1/10 per cent	8 per cent—no additional cumulative specific duty for vanadium
305 Tungsten iron or steel	8 per cent plus 72c. lb. contained tungsten in excess of 2/10 per cent	8 per cent plus 72c. lb. contained tungsten in excess of 2/10 per cent	8 per cent plus 72c. lb. contained tungsten in excess of 2/10 per cent	8 per cent plus 72c. lb. contained tungsten in excess of 6/10 per cent

*Earthenware Schedule (2).

(Continued on page 218)

ator Oddie of Nevada, who originally proposed to step up the rates to as high as 1½c. a lb. for 30 per cent manganese. The vote was 60 to 18. The only two Democrats voting to sustain the Finance Committee amendment were Senator Barkley of Kentucky and Senator Walsh of Massachusetts. Among regular Republicans who voted for the Oddie amendment was Senator Smoot of Utah, chairman of the Finance Committee.

Pig Iron Cut Carried 48 to 30

The amendment to cut the duty on pig iron to 75c. from the rate of \$1.50 proposed by the committee was offered by Senator Barkley and was adopted by a vote of 48 to 30. The House bill continues the present duty of \$1.125. The four Democrats who voted against the Barkley amendment were Senators Ransdell and Brou-

sard of Louisiana; Senator Heflin of Alabama and Senator Kendrick of Wyoming. A number of regular Republicans voted for the Barkley amendment. These two record votes are typical of those made on other items. It is therefore not entirely true that the changes made in the schedule were dictated solely by the coalition, though its controlling position was manifest at all times.

One of the capricious turns taken in the course of action on the schedule was the retention of sponge iron in the earthenware schedule at the existing rate of 30 per cent ad valorem, or the specific equivalent of about \$9, a rate apparently sought from no source. This product, so far made in the United States only experimentally, comes entirely from Sweden, and it was the purpose of the Senate Finance Committee to put the item in the first paragraph of

the metal schedule with a rate of \$2 a ton, as against the House bill rate of 0.3c. a lb. or \$6.72 a ton.

Ferromanganese Duty 1½c. a Lb.

In voting the 1c. duty on manganese ore, the Senate found that it had automatically restored the compensatory duty of ¾c. a lb. on ferromanganese so that the duty of 0.65c. a lb. on the alloy proposed by the Finance Committee was restored to 1½c. a lb. Likewise, it automatically eliminated the Finance Committee amendment reducing by 0.0087c. a lb. the duty on virtually all steel imports. The coalition left in the tariff bill the minimum of 1½c. a lb., as a base for applying steel duties. In the present tariff law the minimum is 1c. a lb., and the American Iron and Steel Institute urged the advance to the 1½c. minimum on the ground that steel, regardless of where it is made, can

Senate Bill Paragraph	Rate Adopted by Senate	Reported by Senate Finance Committee	House Bill Rate	Present Rate
305 Molybdenum steel or iron	8 per cent plus 65c. lb. contained molybdenum in excess of 2/10 per cent	8 per cent plus 65c. lb. contained molybdenum in excess of 2/10 per cent	8 per cent plus 65c. lb. contained molybdenum in excess of 2/10 per cent	8 per cent plus 65c. lb. contained molybdenum in excess of 6/10 per cent
305 Chromium steel or iron	8 per cent plus 3c. lb. contained chromium in excess of 3/10 per cent	8 per cent plus 3c. lb. contained chromium in excess of 3/10 per cent	8 per cent plus 4c. lb. contained chromium in excess of 2/10 per cent	8 per cent—no additional cumulative specific duty for chromium
312 Structural shapes, plain, lb.	1/5c.	3/10c.	1/5c.	1/5c.
312 Sheet piling	1/5c.	3/10c.	1/5c.	1/5c.
316 Tungsten and molybdenum wire, per cent		60	25 (up)	25 per cent
317 Wire fencing and netting (.03-.08 inch)	45 per cent	5/16 or 9/16c. sq. ft.	50 per cent	40 per cent
319 Reaction chambers, per cent	50	50	40	25 to 40 per cent
327 Molders' patterns	50	50	40	40
338 Iron or steel screws, per cent	25	45	25	25
338 Butts and hinges	40	50	50	40
344 Alloy steel cylindrical rolls, per cent	In excess of 1/10 per cent vanadium or in excess of 2/10 per cent tungsten, molybdenum or chromium, 40	In excess of 1/10 per cent vanadium or in excess of 2/10 per cent tungsten or molybdenum or in excess of 3/10 per cent chromium, 40	In excess of 1/10 per cent vanadium or in excess of 2/10 per cent tungsten, molybdenum or chromium, 40	25c. lb. plus 8 per cent
352 Alloy metal cutting tools, per cent	In excess of 1/10 per cent vanadium or in excess of 2/10 per cent tungsten, molybdenum or chromium, 60	In excess of 1/10 per cent vanadium or in excess of 2/10 per cent tungsten or molybdenum or in excess of 3/10 per cent chromium, 60	In excess of 1/10 per cent vanadium or in excess of 2/10 per cent tungsten, molybdenum or chromium, 60	In excess of 6/10 per cent of molybdenum, 60
353 Electrical products, per cent	30	30	40	30 to 40
369 Automobiles, motor-cycles, light chassis, and body, per cent	10	10	25	25
372 Steam turbines	15	15	30	15
372 Full-fashioned knitting machines, per cent	40	40	45	40
372 Punches, shears and bar cutters per cent	30	30	40	30
372 Gear cutters and hobbers, per cent	40	40	40	30
372 Meat or food grinding or cutting machines, per cent	30 to 40	50	30 to 40	30 to 40
302 Tungsten ore	50c.			
302 Ferrotungsten	60c. and 25 per cent			
302 Cerium metal	\$1			
302 Ferrocerium	\$1 and 25 per cent			
316 Tungsten and molybdenum products, per cent	60			
372 Machine tools, per cent	30	30	30	30
398 Iron and steel not specially provided for (basket clause)	45	45	50	40

(Blank spaces indicate that no action was taken)

not profitably be sold at as low a price as 1c. and that therefore this base was absurdly low.

The amendment to reduce the committee duty on structural steel from 3/10c. to 1/4c. carried by a vote of 51 to 19 and it was by practically the same vote that the rate on sheet piling was reduced to 1/4c. The House and present rate on each product is 1/4c.

Alloy Steel Duties Changed

For the most part duties proposed by the Finance Committee on alloy steels were adopted and in some cases represented reductions under House rates. The Senate Committee increased from 2 per cent to 3 per cent the chromium content which was to be dutiable, thus having the effect of reducing the duties. After this change had been accepted in several cases by the Senate, Senator Walsh, Democrat, of Montana, observed the change when it came to alloy cylindrical rolls and insisted that the 2 per cent be made applicable to chromium steel in this item as he did in the subsequent item of alloy metal-cutting tools. It was not clear whether Senator Walsh realized that he had actually voted for an increased duty, though he had been told by Senator Smoot that that would be the result. Nevertheless, the coalition accepted the Walsh amendment.

The application of the 1c. a lb. duty on 10 per cent manganese will, based on the 1928 movement, affect 15,000 additional gross tons of contained manganese which would be made dutiable over and above the 268,176 gross tons of contained manganese imported at a dutiable rate that year, and applying only to manganese grading 30 per cent or higher. The duties collected last year totaled \$6,007,142. The duty on the additional 15,000 tons would be \$33,600. The ad valorem equivalent of the 1c. duty on 1928 manganese imports was 88.8 per cent and it would be raised to 89.5 per cent under the amendment adopted by the Senate.

Bill May Be Killed

There is a growing belief that the bill will never emerge from conference. The prevailing opinion is that the Senate will pass the bill sometime during the forthcoming regular session. Senator Reed of Pennsylvania, in the Senate last week, reiterated the view that the bill is dead. He thinks the coalition intends to kill it. There are others who think that, since it is writing the bill, ostensibly in behalf of the agricultural interests, the coalition is anxious to have the bill enacted. The fact remains, however, that some irregular Republicans have openly expressed the hope that it will be killed. The view also prevails that the House conferees will not accept many of the changes made by the Senate and rather than yield to the latter will let it die. It is apparently clear that if the once rejected debenture bill is tied to the tariff, as proposed by the coalition,

the House will not accept it, or, even if the House conferees did yield, it is assumed that the President would veto the bill. There is also a great deal of speculation as to whether the House conferees or the President will accept the flexible provision as written by the coalition. As drafted into the Senate bill the right of the President to increase or decrease rates, following investigation by the Tariff Commission, would be taken away and it would be vested in Congress. Those favoring retention of

the Presidential authority claim that because of the always wide differences in Congress on tariff questions it would be impossible for it to put the flexible provision to practical use, either because of intolerable delays or complete deadlocks. One of the weak points of the flexible provision, as it now is operated, is the long time required for investigations. The House provision would eliminate this feature by permitting prices to be based upon invoices instead of calling for investigation abroad of costs.

Advantages of Mergers Discussed

Management Meeting Also Hears Talks on Bonuses Plans for Executives, Pension and Retirements Funds

MERGERS in business were discussed at the autumn meeting of the American Management Association, held Oct. 29 to Nov. 1, inclusive, at the Hotel Statler, Detroit. "Conditions That Bring About Mergers" was the subject of a talk by O. W. Visscher, editor of the *Business Bulletin* of La Salle Extension University. Mr. Visscher said that the country is going through the greatest merger development in its history, and that only two-thirds of the businesses of 1914 remain, the reduction being almost solely due to mergers. He pointed out that both political and public opposition to mergers is disappearing.

That mergers offer certain advantages to business, such as lessening competition, reducing selling overhead, more effective advertising and greater buying efficiency, was suggested by Mr. Visscher, who added that the human factor as exemplified in management is the greatest value. Often, he said, a better and more permanent management is gained through consolidations of companies.

Some disadvantages were pointed out, such as loss of incentive among valuable employees because of lesser opportunities for promotion and inefficient functioning of new associates due to lack of coordination in new surroundings.

A. D. Berning, partner in Ernst & Ernst, accountants, in a paper entitled "Factors to Consider in Working Out Mergers," said that the benefits to be derived from mergers are in the operation and not in the forming. He outlined various essential factors upon which a successful merger must be predicated.

W. E. Harris, United Fruit Co., Boston, contended that the need of American industry is not for new large combinations of productive capacity, but a more thorough search for new markets. Mr. Berning replied to this that he considered mergers to be a definite step toward the development of new markets because larger organizations are in a better position to undertake such work,

which often involves expensive research and advertising.

At a session devoted to bonus systems for executives, S. R. Rectanus, American Rolling Mill Co., Middletown, Ohio, described the executive bonus methods of that company. He said that originally it was the company's belief that all salaried employees should receive bonuses in proportion to their salaries, but this idea has changed. In 1922, 900 salaried employees were compensated out of a fund set aside from the earnings. Length of service was taken into consideration, 1 per cent extra having been awarded for each ten years of service. From 1922 to 1928, 200 of the company's 1500 salaried employees received shares in a bonus fund of \$200,000. The bonus plan is restricted to a fewer number now, it being believed that many of the company's employees are not interested in earnings and that those who are responsible for growth in business in profits should receive the rewards.

A. S. Rodgers, president, White Sewing Machine Co., Cleveland, explained the managerial profit sharing plan of that company, which is based on performance of duty over certain pre-determined standards.

Eastman Pension Plan

Employee pension plans were also discussed. M. B. Folsom, assistant to the chairman, Eastman Kodak Co., described the pension, retirement and benefit plan of that company. The company has created a fund of \$6,500,000, two-thirds of which has been paid in. This money is administered by an insurance company, which pays a wage dividend of 10 per cent of a worker's salary after five years' service, a weekly salary of \$26.50 during sickness, a year's salary in the event of death, besides life insurance and certain remuneration upon retirement. The employee pays nothing. When the full principal is paid in, which will be within the next few years, all employees of 10 years' service or more will be covered.

Disagree on Depreciation Rate

Machinery and Equipment Builders at Odds With Bureau of Internal Revenue—Proposed Schedules Held Unacceptable

WASHINGTON, Nov. 11.—Meeting here today at the Chamber of Commerce of the United States, the fourth conference of representatives of machinery and equipment associations expressed strong disapproval of depreciation rates which the Bureau of Internal Revenue Treasury Department, is reported to have set up for application in making income tax returns. The conference adopted a resolution to be forwarded to the Commissioner of Internal Revenue suggesting that basic rates should be established through cooperation between trade associations and the bureau, action which was prompted by the fact that the bureau no longer is receiving data from the trade associations.

John T. Keenan, one of the bureau's engineers, however, told the conference that material which had been received from the bureau would be used. At the same time the conference felt that there will be difficulty in convincing the bureau of the unfairness of the rates which, it is said, will be published early next year.

It was declared that the rate for one group of machinery items is listed at 5 per cent, while representatives of the industry are of the opinion that it should be at least 10 per cent. Many other rates were read to the conference by E. F. DuBrul, general manager, National Machine Tool Builders' Association, who presided as chairman.

Rates Not To Be Mandatory

Although Mr. Keenan said that the rates to be published will not be mandatory, and that the bureau had made an investigation for the purpose of helping all industries as well as the bureau in developing uniformity and establishing a guide for charging off depreciation, apprehension was expressed that the machinery and equipment interests would be unable to obtain proper allowances.

Mr. Keenan endeavored to assure the conference that the machinery and equipment manufacturers could charge whatever depreciation rates they thought were right, and that the bureau would give them fair consideration. He was told, however, that it would be more desirable to agree in advance upon basic rates, because such a policy would avoid conflicts and expense of litigation, etc., and also develop uniform accounting, a subject which has caused a great deal of difficulty to the industries.

When Mr. Keenan was told that the bureau had abandoned cooperation with the trade associations, he explained that the rates were arrived at after investigation among users of machine tools and equipment. He

also pointed out that the field agents had found a broad difference of opinion among users as to the useful life of machinery.

Depreciation Charges Have Not Been Uniform

He said he realizes the position of the manufacturers of machine tools and equipment and that he is of the opinion that some makers are not charging off enough for depreciation, while in some instances he believes too much has been charged off. It is the hope of the bureau, he said, to point the way to make the proper depreciation charges. It is his opinion that no one can determine definitely the useful life of machinery and equipment, but it can be estimated.

In reply to a question by Mr. DuBrul, Mr. Keenan said that after the engineers have completed the work on fixing rates, the entire matter will be turned over to Treasury officials. Mr. DuBrul predicted that there would be a great deal of trouble encountered with field agents, an opinion voiced also by W. W. Nichols, Allis-Chalmers Mfg. Co., president of the Machinery Builders' Society. Mr. Nichols spoke of the differences of opinion among field agents regarding rates of depreciation.

Obsolescence, also, was discussed in connection with depreciation. The conference felt that the Treasury grants inadequate allowances for obsolescence.

Profits in Various Lines

Chairman DuBrul laid before the conference reports of the Bureau of Internal Revenue showing returns of machinery, equipment and other lines of metal manufactures for 1924-1927. The tabulation showed 8 per cent profit earned against the total gross income for both 1926 and 1927 for 10 lines of production.

The lowest return, 4 per cent, made in 1927, was reported for products of blast furnaces, steel mills and rolling mills. The highest, 12 per cent, made in 1927, was reported for agricultural machinery and equipment. For the 10 lines, 11,644 companies reported no net income in 1927, while 12,139 reported no net income in 1926.

Handling Motor Discounts

The varying policy in each manufacturing group with regard to handling electric motor and other discounts was discussed at some length, without any action being taken. The differing discounts allowed by motor manufacturers to machine tool and machinery equipment makers was held to be based largely on the status of the purchasers. They range from 5 to

25 per cent, depending on whether they are large or small buyers.

It was the opinion that competitive conditions in the market for machine tools and equipment play an important part in the policy of makers of these lines, as to charges made for motors bought from manufacturers. Generally, it was stated, the charge made for motors by machine tool and equipment manufacturers merely represents the list price and discounts allowed by motor manufacturers.

When buyers of equipment purchase their motors direct for installing on the equipment, it was stated, the only charge is that for installation of the motors. It was declared that motor manufacturers do not ordinarily offer machine tool and equipment makers sufficient discount to provide the latter with a profit in stocking the motors, involving handling and other charges.

Oppose Trade Mark Proposal

Individuals in the conference expressed opposition to the trade mark and patent notice features added to the tariff bill by the Senate Committee on Finance, which would unconditionally prohibit American trade-marked imports, and supported the position of the Merchants' Association of New York, seeking repeal of the amendment. Restoration of the present provision in the existing tariff act and continued in the House bill was urged by the Merchants' Association.

The Conference voted to hold its next meeting in Washington, on Feb. 3, 1930.

Those attending the present conference were:

Association of Manufacturers of Woodworking Machinery, Fred A. Collinge, manager, Chicago; L. P. Monks, president, Hermance Machine Co., Williamsport, Pa.; Bakery Equipment Manufacturers Association, Miss Olga Christianson; Compressed Air Society, C. H. Rohrbach, secretary, New York; Concrete Mixer Manufacturers Bureau, Clifford F. Messinger, Chain Belt Co., Milwaukee; Dairy and Ice Cream Machine and Supplies Association, C. E. Breece, assistant secretary, New York; Forging Manufacturers Association, G. H. Weller, secretary-manager, New York; Foundry Equipment Manufacturers Association, Verne E. Minich, American Foundry Equipment Co., New York; Machinery Builders' Society, W. W. Nichols, president, Allis-Chalmers Mfg. Co., New York; Associated General Contractors, C. S. Embrey, secretary, Mixer Manufacturers Bureau, Washington; National Machine Tool Builders' Association, C. A. Johnson, president, Gisholt Machine Co., Madison, Wis.; Ernest F. DuBrul, general manager, Cincinnati; Pressed Metal Institute, Malcolm Baird, secretary-treasurer, Buffalo; Refrigerating Machinery Association, D. N. Benedict; also Hugh P. Baker, manager and Philip P. Gott, assistant manager, Trade Association Department, Chamber of Commerce of the United States, Washington; E. W. McCullough, manager, Department of Manufacture, Chamber of Commerce of the United States, Washington; W. H. Rastall, chief, Industrial Machinery Division, Department of Commerce, Washington; M. Bacher, manager, Foreign Commerce Department, Chamber of Commerce of the United States, Washington.

Rejuvenation of Gray Iron Planned

Gray Iron Institute to Undertake Campaign to Enhance
Prestige of Castings

BY L. W. SPRING*

STEEL has been made in many varieties since its production in commercial quantities as a result of Bessemer's invention of 1856—some soft and ductile as in fence wire, some hard and brittle as in needles and sharp edged tools. Cast iron has none of such properties, but it has others which make it well adapted for certain purposes for which steel will not answer.

In brief, these properties are high fluidity, which enables molten cast iron at comparatively low temperatures to fill intricate molds; low shrinkage while the metal is solidifying in the mold; easy machining, because of the natural cleavage or breaking up of the grain of cast iron by the soft graphite flakes and the natural lubrication of the tool which these flakes afford, and considerably greater resistance to rusting and ordinary corrosive influences than steel.

The natural objections to ordinary cast iron are its lower strength of 20,000 lb. against the 60,000 to 80,000 lb. per sq. in. which steel has and its great brittleness or likelihood of breaking under shock which introduces grave danger of complete collapse under overload. Steel, because of its ductility, simply distorts and gives warning before any great danger to life comes about.

It now appears that this lowliest of the ferrous alloys is undergoing rejuvenation. Although it has been overlooked for many years and by some given up for lost, certain metallurgists have insisted that a material of so many excellent qualities perhaps could be converted into a more adaptable product if a fraction of the brains and money could be put into it that had been put into the development of steel and the steel industry. The results of two or three experiments have been so encouraging that a considerable change in the attitude toward cast iron is coming about.

Perhaps the most interesting point just now is the formation of the Gray Iron Institute, Inc., which will follow the system used by the steel manufacturers, by the American Malleable Iron Castings Association (now the Malleable Iron Research Institute, Inc.) and by others, the foundry owners supporting jointly a campaign of development which it is hoped will improve the inferior properties of cast iron and standardize the better

product produced, following which advertising and sales campaigns will endeavor to bring this material into the position that it deserves.

Types of Cast Iron

To many people, cast iron is cast iron, and it will be of interest to those who have paid slight attention to this valuable alloy to know that there are several varieties of this material each of which has certain particular advantages for certain service.

Soft or Gray Cast Iron.—Soft cast iron with about 20,000 to 25,000 lb. per sq. in. tensile strength owes the greater part of its character to the 3 to 3.5 per cent of carbon which it contains. The amount of free graphite which we may call the dominating influence in cast iron is controlled by the manufacturer mainly through the amount of silicon that he puts into the cast iron, and, secondarily, by his rate of cooling the iron from the molten into and through the solid state. The higher the silicon, therefore, the softer the cast iron because of the greater advantage of graphitization induced; also, the slower the cooling after the iron enters the mold, the softer the iron will be. Ordinarily, gray iron such as is found in stove parts, engine beds, water mains and soil pipes, is of this type.

Semisteel or High Test Cast Iron.—For some purposes, a considerably stronger cast iron is desired. By reducing the silicon content used in the cupola from the usual 2.50 per cent for soft cast iron to such lower amount as, say 1.80 per cent, less graphite is precipitated. The iron is a little harder, slightly less machineable, but with tensile strength of something like 35,000 lb. per sq. in. instead of the 20,000 lb. which soft cast iron shows. This type of cast iron is known generally as semisteel, though certain foundries and scientific societies are endeavoring to banish the name, giving it the more significant name, high test cast iron, which, of course, it is, because of its 50 per cent greater tensile strength.

Chilling Irons.—The farmer for several decades has known the Oliver chilled plow and the railroads have used chilled car wheels, though now steel wheels are available. Such products, along with brake shoes, chilled iron rolls for rolling mill work, gears and other parts which must stand hard wear have been cast from iron containing much less silicon

even than semisteel. These "chilling" irons contain from 1.50 to 0.09 per cent silicon or thereabouts, the amount depending on the depth of chill desired. When cast against a "chill" (cold piece of iron which is inserted to form part of the mold), the entering molten iron is made to freeze almost instantly into a white, extremely hard layer so hard as to resist wear and abrasion very definitely. The iron is white because the quick cooling allows the graphite flakes little or no time to crystallize out. Usually the chill is so arranged that the white or chilled layer will be backed by a heavier layer of iron, which is kept gray by slower cooling. This gray layer, while much softer, has much less brittleness and thus contributes to the strength of the casting.

Malleable Cast Iron.—We are all acquainted with malleable cast iron, the somewhat ductile metal of which the cast parts for agricultural machinery, railroad car bumpers and brake beams, pipe fittings, and even cheap hammers, tin snips, and some other tools are made. The composition of such iron, its pouring temperature and handling have to be regulated with extreme nicety. It is a highly chilling iron with from 0.75 to 1 per cent of silicon, which chills so readily that every part of every casting must come white in fracture after cooling in the mold. This is necessary because such brittle iron can be made malleable only after 40 hr. or more of continuous annealing at a temperature ranging between 1400 deg. and 1800 deg. Fahr. in closed pots, followed by very slow cooling of not more than 10 deg. Fahr. an hour, through the "critical" range (from 1400 deg. to 1200 deg. Fahr.). When taken from the mold, a slight blow from a machinist's hammer will shatter a small casting into many pieces, all with white fracture, but after this annealing process of approximately a week, the casting is soft and malleable and can be broken only with difficulty. While this material after annealing has a total carbon content of from 2 to 3 per cent, the metal remains malleable because by the annealing process the carbon separates not in flake form, as in gray iron, but rather in granular form in which it is seen under the microscope as little balls of "coke" lying among the grains of iron. There are no cleavage planes in annealed malleable iron and the continuity and adjacency of the iron

*From a paper read before the Chicago Section of the American Chemical Society. Mr. Spring is chief chemist and metallurgist of the Crane Co., Chicago.

grains obviates the brittleness and makes for ductility.

Pearlitic Irons.—Besides these four very common varieties of cast iron, which of course are varied in composition somewhat for different purposes so that one class sometimes merges into the other, we now have a newcomer—a more aristocratic cast iron known as pearlitic cast iron. As explained already, cast iron has been noted for and used because of its good qualities—fluidity, easy machineability, high compressive strength, and comparative cheapness—but always it has been heavily penalized because of its brittleness or low shock strength and for its lack of sufficient tensile strength.

By the metallurgist, cast iron, theoretically, is considered as being steel into which an added constituent, flake graphite, has been introduced and distributed. It occurred to the metallurgist that during the casting process it might be possible to diffuse this graphite in a way somewhat analogous to the manner of its form and distribution in malleable iron—that is, better distributed and without the long, curly, fragile flakes which produce cleavage planes in cast iron. The result is pearlitic cast iron, which, under the microscope, is seen to have a somewhat greater amount of pearlite (the strength-giving constituent of steel) with almost a total absence of long flakes of graphite, these being replaced by

graphite in very small rosettes or better in little stubs. On viewing the structure through the microscope, probably even the least experienced would decide that there would be less fragility in the alloy, and this is the case.

This very desirable strong and tougher pearlitic cast iron can be made by three main processes which are coming gradually into use. By the first of these, a low silicon or chilling iron, which would give white fracture castings if poured as usual, is poured instead into heated molds, the higher temperature being sufficient to overcome any tendency of the iron to chill, and the lack of silicon preventing separation of graphite.

A second process produces castings with this desirable pearlitic structure through careful proportioning of the charge, carefully regulated composition, and the use of comparatively high-pressure blast in the cupola.

The third process brings about the same result by superheating the molten metal to a high enough temperature so that, on pouring, the molds themselves in effect are automatically heated by the metal, and the still molten iron is allowed to cool in them. While the first two processes mentioned are cupola methods, the third uses the electric furnace, by means of which the iron can be highly superheated, sometimes to 3000 deg. Fahr. or more.

Warehousing Rustless Iron Sheets

Polished Surfaces Are Handled With Gloves and Protected By Paper When Sheared Or Corrugated On Order

DISTRIBUTION of rustless iron from stock has added a product to the warehouse that must be handled with more than the usual care given to a high grade steel. In its Jersey City, N. J., warehouse, Joseph T. Ryerson & Son, Inc., maintains a stock of 60 to 70 tons and more of Nos. 11 and 12 to 24-gage sheets of Alleghany metal and Ascoloy. While the Ascoloy can be handled easily, as it is not highly polished, distribution of Alleghany metal sheets necessitates special care.

As a rule, the warehouse ships orders every second day. The sheets, which are received from the mill wrapped in a heavy tissue and crated, are taken from the crates to the shears by workmen wearing gloves to prevent finger marks appearing on the polished surface. In the shear, heavy tissue is placed on the sheet under the clamps to prevent scratching the surface, and before the shear can be used all grease and oil is removed from exposed parts to prevent soiling the sheet. After cutting, the sheets are returned to the rustless iron stock-room, and are wrapped in a heavy crimped paper with a tarred center and placed in a new crate for delivery to the consumer.

Shearing to the required size leaves a quantity of small strips, which with ordinary sheets would unquestionably go to the scrap pile. With rustless iron, however, only the smallest scraps of metal are discarded, strips, sometimes of only a few inches in width being carefully wrapped in paper and returned to stock as possibly salable at a slight reduction in price to some other customer. The salesmen, knowing of an accumulation of such material in a certain size, are often able to dispose of it to a manufacturer who has not been using rustless iron.

Recently a number of long narrow strips had accumulated in stock from an order placed by a large user, and a manufacturer of show cases, who had been using other metals, became interested and purchased the strips at a reduction from the full market price.

When a piece of rustless iron is so small that it reaches the scrap pile it has decreased in value far more than ordinary steel scrap and seldom brings much more than 1c. per lb., although the original selling price of the new material ranged from 45c. to 66c. per lb. out of stock. Consequently, the scrap pile is kept at a minimum to prevent unnecessary loss.

The care with which such sheets are

handled is exemplified in a small order recently executed by this warehouse for sheets used in decorating a modernistic room in the Metropolitan Museum of Art in New York. The ceiling of the room was sheathed with corrugated, rustless iron sheets and, in corrugating them, each sheet was covered with paper before passing it through the corrugating machine, to prevent damage to the surface.

Program of Annual Meeting of Taylor Society

The annual meeting of the Taylor Society will be held at Hotel Pennsylvania, New York, Dec. 4 to 6. The program follows:

Wednesday afternoon, Dec. 4, Edward Eyre Hunt, presiding:

Analysis of "Recent Economic Changes" with emphasis on subjects of practical interest to management, by R. W. Burgess, chief statistician, Western Electric Co., New York.

Wednesday evening, Dec. 4, Henry Bruere, presiding:

"Are There Practical Steps Toward an Industrial Equilibrium?" by Wesley C. Mitchell, National Bureau of Economic Research and Columbia University, New York.

"What Bearing Has Industrial Equilibrium on Regularity of Operations and of Employment?" by Leo Wollman, New School of Social Research, and director of research, Amalgamated Clothing Workers of America, New York.

Thursday morning, Dec. 5, Morris L. Cooke, presiding:

"What Are the Controllable and the Uncontrollable Factors in Management?" by Howard Coonley, president, Walworth Co., Boston.

"Is There an Optimum Size of Organization (Centralization vs. Decentralization)," by John H. Williams, consulting engineer, New York.

Thursday afternoon, Dec. 5: Roundtable discussions on industrial standardization, accounting for distribution costs, and marketing with special reference to planning, organization and supervision.

Thursday evening, Dec. 5: Annual dinner, with reports on management in Western Europe, Russia and Japan from returned travelers.

Friday morning, Dec. 6, Percy S. Straus, presiding:

"Is It Good Management Policy to Assume That Consumer Wants for Particular Goods Are Insatiable?" by Paul H. Nystrom, business and marketing consultant, Columbia University, New York.

"Is It Sound Assumption That Consolidation Results in Reduction of Distribution Expense?" by J. E. Judson, Ford, Bacon & Davis, New York.

Friday afternoon, Dec. 6, R. H. Lansburgh, presiding:

"The Technique of Methods of Study," by H. K. Hathaway, consulting engineer, New York.

Friday evening, Dec. 6, Henry P. Kendall, presiding:

"How Shall Large Groups Be Organized and Managed to Secure the Ability, Capacity and Energetic Effort of Each Individual as Though He Were in a Business of His Own?" by Malcolm C. Rorty, president, International Telephone Securities Corporation, and vice-president, International Telephone & Telegraph Co., New York.

This Issue in Brief

Good dividends in production are paid by apprenticeship course in machine tool plant. No shop training room is used. Apprentices are assigned directly to production departments, and work on a production basis, under joint supervision of foreman and shop instructor. Fifty per cent of the graduates since 1915 are still with the company, and nearly all hold responsible positions.—Page 1293.

"Anti-aging" steel is not an alloy, but a carefully made open-hearth steel. The German product, Izett, adapted especially for boiler fabrication, as it resists embrittling influence of alkaline feed water, is thoroughly "washed" with manganese during the melting process, and then killed with aluminum. — Page 1302.

True elastic limit of structural steel columns proves to be much lower than minimum yield point. Carbon steel columns failed at about 84 per cent of calculated yield point, silicon steel at 96 per cent and manganese steel at 99 per cent or better.—Page 1302.

Heat treating costs reduced by preheating air for oil combustion. Air for combustion is forced through a coil in a recuperator, where it is heated to about 600 deg. Fahr. and then delivered to oil burners.—Page 1304.

Reduction in oil consumption in steel casting plant is obtained by installing an oil indicator showing number of gallons burned each hour. As results are visible to operators, competition for low oil consumption is promoted.—Page 1308.

Poor quality steel results from use of scrap over and over again. "Inbreeding" process is undesirable. A prominent metallurgist declares that all heats of steel should be made with at least 70 per cent virgin metal.—Page 1310.

Overstressing increases the endurance limit of steel, metallurgists believe. Tests reveal that the yield ranges on overstressed specimens are always greater than corresponding results for steel in its primitive state.—Page 1306.

Better steel at lower cost results from providing proper amount of air for the fuel burned. Automatic open-hearth furnace control eliminates guesswork. Less excess air reduces fuel consumption, and, with less excess air, there is much less waste gas and longer furnace life.—Page 1308.

Rustless iron sheets are handled with gloves, to protect polished surfaces. Sheets are protected by paper when sheared or corrugated. As scrap value is low, only the smallest scraps are discarded. Small pieces are sold at slightly reduced price to manufacturers producing small parts.—Page 1322.

This slat conveyor turns corners. Inner corners of slats are cut away to allow clearance in making turns. Openings between slats do not interfere with handling tote pans, boxes and other packages with flat surfaces.—Page 1312.

Merger movement greatest in history of country, says economist. Only two-thirds of the businesses of 1914 remain, largely due to mergers. There is no economy merely in merging, but in cost reductions worked out after the merger.—Page 1319.

Cast iron is undergoing rejuvenation, says metallurgist. The lowliest of ferrous alloys is on the threshold of a new day, which would have dawned long before this if cast iron had received a fraction of the brains and money that have been put into the development of steel.—Page 1321.

Annealing costs cut and quality of product improved by controlling cooling as well as heating cycles. To reduce heat capacity of the furnace structure, the chamber is lined with light weight semi-refractory brick, which allows the walls to heat or cool in nearly half the time consumed by ordinary refractories. Cooling coils and auxiliary ventilating system permit the cooling cycle to be varied.—Page 1311.

Lubricating parts subjected to hot water or steam presents a difficult problem. Straight mineral lubricants will not withstand the washing action of hot water, so the lubricant is compounded with substances giving it adhesive properties. Bath lubrication is favored where conditions permit use of oil tight gear cases.—Page 1299.

Load-carrying strength of silicon structural steel and manganese structural steel box-section columns is much greater than that of carbon steel columns. Tests to destruction reveal that manganese steels will withstand almost twice the stress at which the carbon steel columns fail.—Page 1300.

Heat-treating labor cost cut by use of interconnected furnaces. Normalizing, hardening and drawing furnaces are in line, connected by automatic mechanical-handling system. The unit is flexible as to range of heat treatment and size of work.—Page 1304.

Increases open-hearth furnace output 10 per cent by installing special combustion control equipment to mix blast furnace and coke oven gas so as to give a constant value of about 500 B.t.u. to the cubic foot. Cost of equipping one furnace is about \$10,000.—Page 1308.

A. I. FINDLEY
Editor

THE IRON AGE

W. W. MACON
Managing Editor

ESTABLISHED 1855

Some Things That Will Help

IT is too early to foresee the full effects of the securities crash on business. That a shock to industry and trade is unescapable is well understood, but it is also appreciated that the shock will be much more severe if narrow, selfish motives are permitted to dominate business policy.

The force of circumstances is strong and the integrity of one's own business is perforce a prime consideration; but there is evidence that immediate private advantage is being subordinated to the general good to a greater extent than in other Wall Street crises. Business leaders have not forgotten the old alternations of feast and famine and in recent years have learned the benefits of stability. They realize that they are trustees of prosperity.

When the October hysteria in Wall Street was at its worst, the Rockefellers and others announced that the declines had gone too far and backed up that conviction by buying securities. Later, extra dividends were declared by the United States Steel Corporation, the American Can Co. and other companies.

What has been done to restore public confidence will be matched, it is hoped, by constructive measures to prevent trade reaction. A sharp increase in unemployment at this time would be a much more serious threat to business than Wall Street losses. While these losses will undoubtedly have an adverse effect on consumer buying, the importance of this factor may easily be overestimated. Granted that the speculative mania extended to virtually all classes of the population in New York and other large centers, there are many millions in the smaller towns and on the farms whom it did not reach. The total number of securities owners in this country is estimated at 4,000,000 by M. H. Hutchinson, secretary of the Conference of Statisticians in Industry. A large proportion of these own their shares outright or are paying for them out of their pay envelopes. Over 1,000,000 industrial employees hold stocks in the companies in which they work. Stockholders of this type are in the same position that they were before the stock market collapse except for the depressing knowledge that their holdings have declined in value. Even among those who speculated it is safe to say that paper losses outnumbered monetary losses.

But there is no blinking the fact that the disposition to buy consumer goods has been adversely affected, doubtless to a greater extent than purchasing power. This psychology should not lead business into short-sighted or hasty action. Happily the consequences of ill-considered moves that would seriously affect employment are now better understood than

ever in our history. Even in the automobile industry, in which readjustment was under way before the securities debacle, part-time working schedules have been put into effect by certain companies in an effort to keep all employees on the payroll.

No longer are employees hired and fired with every fluctuation in business volume. Mass production depends on mass demand and the sources of mass demand must be protected. This fact not only tempers the attitude of business in times of stress like the present, but is becoming a fixture in the policy of a growing number of industrial companies. For example, a large manufacturer of heating equipment, whose business is highly seasonal, is now working under schedules which call for operations at an even rate throughout the year, to insure regular employment for its workers.

It is more and more appreciated that an executive's responsibility does not end with his stockholders; that his trusteeship extends to his employees and to the army of ultimate customers, the general public. Whatever we may think of some things that bear the New Era label, this more enlightened thinking of the heads of industry, in contrast with the old devil-take-the-hindmost policy, is one of the most favorable factors in the present situation.

Still a Great Year in Steel

BESSEMER and open-hearth steel ingot statistics for October have some interesting points. In daily rate of production there was almost as much decrease from September to October as there had been in the whole period May to September, which confirms what our market comments have brought out—that steel production was in an important decline before the crash in the stock market had time to become an influence. Beginning only on the afternoon of Oct. 23, the stock market disaster could not have affected the month's production materially. The September to October decrease in daily rate was 7.4 per cent, while the May to September decrease, in four months, was only 7.6 per cent. As to the recent movement being contrary to the usual seasonal swing, it is to be noted that in the last five years there has been an average increase in daily rate, September to October, of 3.9 per cent.

The monthly reports refer only to Bessemer and open-hearth ingots, electric and crucible ingot statistics being gathered only once a year. Last year electric and crucible ingots amounted to nine-tenths of one per cent of the Bessemer and open-hearth, while for this year an allowance of one per cent may be made. Total Bessemer and open-hearth for ten months

is given at 47,758,054 tons. Adding one per cent would make 48,233,000 tons for the full total.

We may now appraise the probable error of forecasts of the year's total steel ingot production. To bring out a total of 55,000,000 tons for the year there would be required a producing rate in the 51 working days of November and December of only 67 per cent, against 85 per cent reported for October, while to make a total of 56,000,000 tons a 77 per cent rate would be required for these two months. The probability is that the fact will lie between these limits. A total of 55,500,000 tons would represent 10.3 per cent increase over 1928, which stood at 50,325,393 tons. From 1923 to 1928 there was a total increase of 16 per cent, averaging 3.2 per cent a year. From 1926 to 1928, two record years with an off year between, the increase was 7 per cent. In future years 1929 will stand out as one of large gain, while the facts of its exceptional first three quarters and its relatively lame ending may be forgotten.

Lotteries and Plant Morale

LOTTERIES which have sprung up in recent years, aiming to reach people of small means, have taken on proportions at many manufacturing plants that demand serious managerial attention. For one thing, management complains, employees spend altogether too much of their earnings in the effort to secure one of the large prizes. For another thing, when some employee wins a few hundred dollars, or, in case of a capital prize, a thousand dollars or more, the fever spreads like wildfire, men and women buying ticket after ticket without thought of the needs of their families.

One of the worst features of the evil is that the lottery operates continuously and every work day some thousands of dollars are distributed to the holders of winning tickets. The usual price of a ticket is 50 cents, which for the habitues, who constitute at least a large minority, means \$3 a week. Where the gambling germ has taken a real hold one daily ticket is not enough. The result is that case after case is brought to the attention of the office through the action of creditors, since too little money is left in the pay envelope for current expenses. Naturally under such conditions the worker's mind is not on his work, morale is lowered and with it production.

Of course the lotteries are illegal. State and Federal statutes prohibit them. But the promoters know the laws and the ways of outwitting them, in which they are abetted by a certain code among their customers, so that betrayals are rare. The promoters avoid the mails. A lottery operating in one State is conducted from an office in another State. The tickets tell no tales. There is no drawing. The winners are determined from published facts or figures, which all may read, such as baseball scores and financial record figures, a favorite being the daily clearing house totals. The owner reads for himself whether or not he has won. He believes the game a square one. But the lotteries always profit hugely.

To the average plant manager the question is not one of ethics or law-breaking, but of the effect of this persistent gambling on his employees. Officials may overlook the milder forms of gambling, such as

a baseball or football pool within a department, where none may profit but the winner, and none may stake more than some trivial sum. The professional lottery is another matter, conducted day after day throughout the year, now dwindling in interest, now, because of a winning, breaking out into a flood of ticket-buying. The evil may be cut off at its root for the time being, where it is discovered that some employee is the ticket-selling agent. But usually the solution is not so simple. Not a few managers are still studying the proper approach. They realize that too drastic action may result only in inducing a more crafty, underground system of continuing the business. How to bring to bear persuasion and an appreciation of the folly of the practice is a baffling problem.

Foresees Better Building Situation

"BEFORE many months a sufficient supply of mortgage money should become available to afford the building industry with a marked stimulant," says the Alexander Hamilton Institute in its *Business Conditions Weekly*. "A second favorable factor is the reduction in the supply of vacant buildings which is resulting from the current curtailment of construction. The downward trend of rents which characterized the situation from the middle of 1924 to the end of 1928 has not been in evidence this year. The rent index (1924=100), after declining from 184 in August, 1924, to 159 at the beginning of 1929, is still at the latter figure."

It is admitted, however, that curtailed purchasing power and the caution of buyers may hinder a recovery of building, and it is also pointed out that high wages may prove a retarding factor. The wage index (1913=100) is now 238 as against 233 a year ago and 179 in March, 1922, when the advance started. The advance in wages, according to the institute, has more than offset the decline in building material prices, the index for the two factors combined now being 195 as against 191 a year ago.

Our Economic Ignorance

STOCK market ups and downs during the last two or three years give economists, professional and amateur, much upon which to reflect. When stocks were rising to an unprecedented average and many persons were realizing profits, while a great many more viewed with satisfaction the rise in the quotational value of their possessions, it was easy for economists themselves to become the victims of illusion in respect to increase in the national wealth, the national income, the national surplus, etc. Promoters made use of such data in their essays for the temptation of customers. There were few philosophers who tried to point out how such calculations would look if things turned the other way around. Since things have so turned we might as well be honest and admit that no one knows enough about our national economy to give him a standing as a prophet.

A national economy is essentially the same as that of an individual person, but it is multiplied by something like 50 millions in the instance of the United States and is immensely more complicated than are

the affairs of the average person among 50 million. However, the basic element is the same, i.e., wealth, and by that term we mean the summary of the physical things that we possess rather than quotational valuations, although we are bound to adopt estimates of value in order to make an addition. The careful individual does this in an annual inventory.

The next thing that he has to know is the amount of his income, which he may subdivide into earned income and profit realized from appreciation in value of property, as indeed he is obliged to subdivide in making his income tax return. He may then figure his saving—his surplus of income over his expenses—and that will be an addition to his wealth, providing he has not had losses by fire, flood and tempest, by property becoming obsolescent, or otherwise, thus losing its value.

The intelligent individual will also examine his expense account and consider what wastes are included in it that may be curtailed. He furthermore will budget the estimates for new facilities that will be required in the future. With such methods he will be able to do some reasonable forecasting. The economists who essay to forecast our national future have scarcely any data of this nature. How then can they do anything but conjecture?

Other data that are necessary in an examination of our national affairs are: Population; number of

workers; percentage of employment; occupational statistics (determination of the personnel attached to the several industries); consumption of commodities; percentage of manufacturing capacity in use; index of general price level; aggregate of taxation (national, State, county and town). This recital of needs is by no means comprehensive; rather is it merely suggestive.

Many of the subjects above mentioned, as well as others of major importance, are already under investigation by economic and statistical organizations, and by departments of the Federal Government. Unfortunately there is an absence of uniformity in their methods and theories, and consequently they offer only fragmentary data that cannot well be pieced together. There is a great need for a council that would collect and summarize what the many individual bodies are doing, would undertake to coordinate their work, would arrange cooperation among them, would establish principles, and in short would assume the functions of a statistical clearing house. With such a directing head, which ought to be of recognized authority (but no part of the Federal Government), there would be developed in the course of time a mass of practical information that would enable us to manage ourselves better than we do now; also it would build some firm ground for prophecy, which there is not now.

Old and New Strategy of Industrial Progress

BY DR. WILLIAM E. WICKENDEN*

SOME men are so significant that they mark an epoch; an era of history closes when they pass to their reward. Will we see another Edison? Probably not. To get perspective on his life and times we must go back to times before the idea of progress was invented. Medieval Europe, living on ideas borrowed from the ancients, fell into static ways. Men cared more for preserving than for improving traditional ways. The free labor of the guilds was more fertile than the slave labor of the ancients. In it a revolutionary idea germinated, that tools and processes could be made better by deliberate effort without waiting for slow evolution.

Early Pioneer Inventors Were Workingmen

The century beginning with Watt's engine in 1767 was the most amazing in all industrial history. Its pioneers were nearly all workingmen, trained by apprenticeship and self-taught in rudimentary science. Their work was so brilliant that men came to have almost boundless confidence in trial and error process of experiment and invention. This tradition was Edison's inheritance and he its most brilliant exemplar.

In a few months we are to celebrate the semi-centennial of the incandescent lamp. Edison did not invent the lamp; the basic ideas were old; but he reduced them to commercial practicality with prodigious experimental labor and resourcefulness. As Edison himself described his method:

*Abstract of an address, "An Epoch in the Making," at the annual banquet of the American Society for Steel Treating at Cleveland, Sept. 12. Dr. Wickenden is the new president of Case School of Applied Science, Cleveland.

Through all those years of experimenting and research I never once made a discovery. All my work was deductive, and the results I achieved were those of invention pure and simple. I would construct a theory and work on it until I found it untenable, then it would be discarded at once and another theory evolved. This was the only possible way for me to work out the problem.

The New Strategy of Progress

In the old order of events the technical arts grew out of discovery and science followed after—usually long after—with her higher refinements. Two great modern industries have grown by reversing this order, the chemical and the electrical. The new plan has been found immensely fertile and time-saving. Thirty years after Faraday worked out the principle of electromagnetic induction, Paccinoti had his dynamo running, while less than ten years separated J. J. Thompson's work on the electrical conduction of gases and Fleming's vacuum tube valve. Three years later De Forest added the third element on which the radio art has been built.

Contrast this record with the 150 years which elapsed between Newcomer's engine and the study of the essential conditions of its efficiency by Carnot and Rankine and you have the case in a nutshell.

The new strategy of progress is the substitution of the orderly attack of the research laboratory for our old dependence on sporadic invention. As one modern philosopher says:

The greatest invention of the nineteenth century was the invention of the method of invention. . . . That is the real novelty which has broken up the foundations of the old civilization.

National Founders to Meet Nov. 20 and 21

The National Founders Association announces that the program for its thirty-third annual meeting, to be held at the Hotel Astor, New York, Nov. 20 and 21 has been completed and will include the following addresses: "Business Policies and Business Information," by Roland P. Faulkner, chief statistician, National Industrial Conference Board; "Seven Years' Foundry Development," by D. R. Wilson, president, Wilson Foundry & Machine Co., Pontiac, Mich.; "Finance," by Frank F. Winans, Baker, Winans & Harden, New York; "The Legislative Situation," by Walter Gordon Merritt, League for Industrial Rights; "Third International Foundrymen's Congress," by S. Wells Utley, Detroit Steel Casting Co., Detroit; "Changing Ideas of Control," by Elton Mayo, professor of industrial research, Harvard University, Graduate School of Business Administration; "The Business of Selling," by R. C. Borden and Alvin C. Busse, professors of public speaking, New York University.

At the convention dinner Wednesday evening, Nov. 20, Thomas S. Hammond of the Whiting Co., Harvey, Ill., president of the association, will be toastmaster. E. H. Sothorn, noted actor, will be the principal speaker, his subject to be, "Reminiscences of the Stage."

Recommends Study of Steel Construction

Charles N. Fitts of the New England Structural Co., in his presidential address to the American Institute of Steel Construction, meeting in convention at Biloxi, Miss., Nov. 13, attributed the satisfactory structural steel sales to the fact that the public is beginning to realize the economies, as well as the safety and security, of steel construction. Mr. Fitts recommended:

1. That preparations be made for a semi-centennial celebration in 1934 of the invention of the skyscraper.
2. That the Federal Government be petitioned to create in the Bureau of Standards a division to diagnose demolished buildings.
3. That an expert investigation be made of the effect of the tall building on taxation, health and society.
4. That the Bureau of the Census be requested to enlarge its current statistics so that trading areas be measured and established for basic commodities, such as structural steel.

Tidewater Rolling Mills is the name of a new company which has taken over the rerolling mill of the Walash & McGee Steel Co. at 646 Doremus Street, Newark, N. J. A New York office has been opened at 75 West Street. The company will make angles, bands, bars, metal lath and special shapes.

The Week in Business

Drift of Current Financial and Economic Opinion



BUSINESS statistics are commanding less interest than usual, for it is realized that the forecast value of past performance in industry and trade has been materially reduced by the stock market collapse. The outlook is further clouded by the fact that a moderate business reaction was already under way, making it difficult to distinguish between normal trade retrenchment and the consequences of Wall Street losses.

Huge "Paper" Losses Will Affect Real Values

"It is all very well to talk of the fundamental soundness of business," says the *Commercial and Financial Chronicle*, "but the disappearance in a month of 25 to 40 billions of *paper values* in the leading industries of the country cannot fail to affect the *real values* thereof. Of course the wheels will continue to turn, production of some volume will go on, but the buying power of the people must be less."

A similar view is held by Benjamin Baker of the *Analyst*, who writes: "The effects of the crash will have an abnormally large influence in slowing business, and will not impossibly make full recovery slower and more difficult than would be the emergence from a depression not aggravated by the existing financial 'hangover.'"

More conservative is the opinion of Alexander D. Noyes, New York *Times*, who says: "Only the course of time will show whether trade has actually been affected, and how greatly." In 1907 and in 1920, he recalls, industrial reaction was cause rather than consequence of events on the Stock Exchange. But an accurate analysis of the present position of business cannot be made until it is ascertained "how far, in some great industries, the rash use of credit from which producers carefully abstained was practised by consumers."

The very attitude of self-examination and caution that business has now assumed will, of course, tend to slow up trade tem-

porarily, but no one doubts the economic soundness and growth of the United States. As Theodore H. Price, *Commerce and Finance*, sums it up: "Even those plants which grow most vigorously do not always grow constantly, and the greatest prosperity has its vicissitudes."

Likens America to England After Napoleonic Wars

Enthusiasm over our prosperity, which was suddenly chilled by the securities collapse, is still held by Lord Hindlip, a British observer, writing in the *Bache Review*. "I think that the low levels reached by the good securities is an incident," he declares, "just as the high levels reached at the peak were an incident. I think they are both stupid, and neither have anything to do with values, and I have not the slightest doubt that in the course of time, maybe six months, maybe one year, or two, the prices reached at the peak will look cheap."

"I think it is quite impossible to be anything but optimistic about America. Shortly, the situation seems to be, on an infinitely greater scale, the same as obtained in England after she recovered from the Napoleonic Wars, when she had some 80 years of great prosperity. . . . We had cheap coal, steam; manufactured for the world in iron, steel cotton, wool; we had the money; we had the shipping trade. Now apart from the shipping trade—and your cotton trade is no worse than ours—you have everything that we had."

Stocks Back on Investment Basis

This picture is in sharp contrast with the gloom that continues to hang over the stock market. Deflation has been so drastic that representative common stocks are already back to prices only slightly more than ten times earnings and are yielding 6 per cent, according to a compilation by the Midland Bank of Cleveland covering 120 dividend-paying issues in ten important industries.

Growth in Structural Steel Sales

Increased Use and New Markets, Despite a Decline in Total Building Construction

STRUCTURAL steel was never selling better in the history of the country, declared Charles F. Abbott, executive director, in his report to the seventh annual convention of the American Institute of Steel Construction, meeting at Biloxi, Miss., Nov. 13. He pointed out that in 1921 some 1,188,600 tons of structural steel was sold in the United States, whereas this year the tonnage will probably exceed 3,950,000. This growth in the business has resulted despite the fact that there has been a decline of some 9 per cent from 1928 in all building operations during 1929.

Standard specifications and more rational use of structural steel promoted by the institute have in part effected this great change. Furthermore, there has been a tremendous increase in bridge building and aggressive work is being done toward promoting the use of steel in hangars,

residences and dams. The time is now ripe, he said, to "rationalize output."

Stabilized Production Must Prevail

"The structural steel industry must understand and accept the theory of stabilized production," said Mr. Abbott. "It is only by an adjustment of supply to demand that prices can be stabilized or maintained at a given point. It is certainly the part of wisdom to have our resources of steel judiciously used, rather than to sell it very cheaply in bulk, with widespread waste and confusion."

"Fortunately, the steel construction industry, through the institute, is making a direct approach to the problem by first studying consumer interests and then adopting measures to meet them, which means a constantly increased use. As markets are extended and new uses developed, consumption will gradually exceed production facilities and thereby bring about rationalized output."

Large Merchant Iron Company Formed

Grouping of Toledo, Perry, Zenith and By-Product Coke Gives 1,100,000 Tons Annual Pig Iron Capacity

WITH an annual pig iron capacity of about 1,100,000 tons, one of the largest merchant pig iron producing companies in the country will be formed by the merger of four important Lake furnace interests operating six merchant blast furnaces, the Toledo Furnace Co., Toledo, Ohio, and the Perry Furnace Co., Erie, Pa., both controlled by Pickands, Mather & Co., and the By-Product Coke Corporation, Chicago, and the Zenith Furnace Co., Duluth. Lake Superior ore mines operated by Pickands, Mather & Co., with sufficient output to supply the new company with all of its iron ore requirements, will be included in the merger.

The linking of organizations that have been closely allied for several years will result in a company with approximately \$75,000,000 in resources. All the merged companies have by-product coke ovens which supply gas to municipalities and districts in which they are located and plants for the recovery of by-products. The output of the furnaces will continue to be sold by Pickands, Mather & Co., Cleveland, and Pickands, Brown & Co., Chicago.

The Toledo Furnace Co. has two merchant stacks at Toledo, both with a daily capacity of 1200 tons; the By-Product Coke Corporation has two Federal stacks with an annual capacity of 300,000 tons, the Perry Iron Co. has one stack with an annual capacity of 125,000 tons, and the Zenith Furnace Co.'s one stack has a daily capacity of 300 tons.

The recently announced authorization of an increase in the capital stock of the By-Product Coke Corporation from 800,000 shares to 2,500,000 shares was the first step in effecting the merger of the four companies. Other details will be worked out shortly.

H. G. Dalton, partner in Pickands, Mather Co., is president of the Toledo Furnace Co. and he and Elton Hoyt, II, a partner in Pickands, Mather & Co., and Fayette Brown, president, Harvey H. Brown & Co., Cleveland, are directors of the By-Product Coke Corporation, of which C. D. Caldwell is president. Pickands, Mather & Co. has for some time been supplying the Chicago company with its iron ore requirements under a long term contract.

Nominating Committee Named by Foundrymen

The 1930 nominating committee of the American Foundrymen's Association was completed recently with the election of four members by a letter ballot of the association membership. Election judges canvassed 816 votes, declaring the following elected to the committee:

M. J. Evans, vice-president, Whiting Corporation, Harvey, Ill.

R. J. Doty, plant manager, Reading Steel Casting Co., Reading, Pa.

Wm. J. Grede, president, Liberty Foundry, Inc., Milwaukee.

T. H. Addie, president, American Manganese Bronze Co., Philadelphia.

In addition to four members elected

annually, the by-laws of the association also provide that the nominating committee shall include the last three living past presidents of the A. F. A. The past presidents thus automatically members of the 1930 committee are A. B. Root, Jr., Hunt-Spiller Mfg. Corporation, Boston, senior past president and chairman of the committee; S. W. Utley, Detroit Steel Casting Co., Detroit, and S. T. Johnston, S. Obermayer Co., Chicago.

A meeting of the 1930 nominating committee will be held shortly after the first of the year, according to announcement by C. E. Hoyt, executive secretary. At that time the committee will consider suggestions from members of the association as to candidates for officers and directors.

New England Council to Meet

Governors of the New England States, editors and industrial leaders will be among the speakers at the Fifth New England Conference, to be held in Boston, Nov. 21 and 22.

Col. E. A. Deeds, chairman of the board of the Niles-Bement-Pond Co., and director of the United Aircraft & Transport Corporation; Henry D. Sharpe, president of the Brown & Sharpe Mfg. Co.; Col. Frederick H. Payne, president of the Greenfield Tap & Die Corporation; Howard Coonley, president of the Walworth Co., and E. F. Gay, National Bureau of Economic Research, Harvard University, will be speakers. The Hon. Charles Francis Adams, Secretary of the Navy, will address the conference.

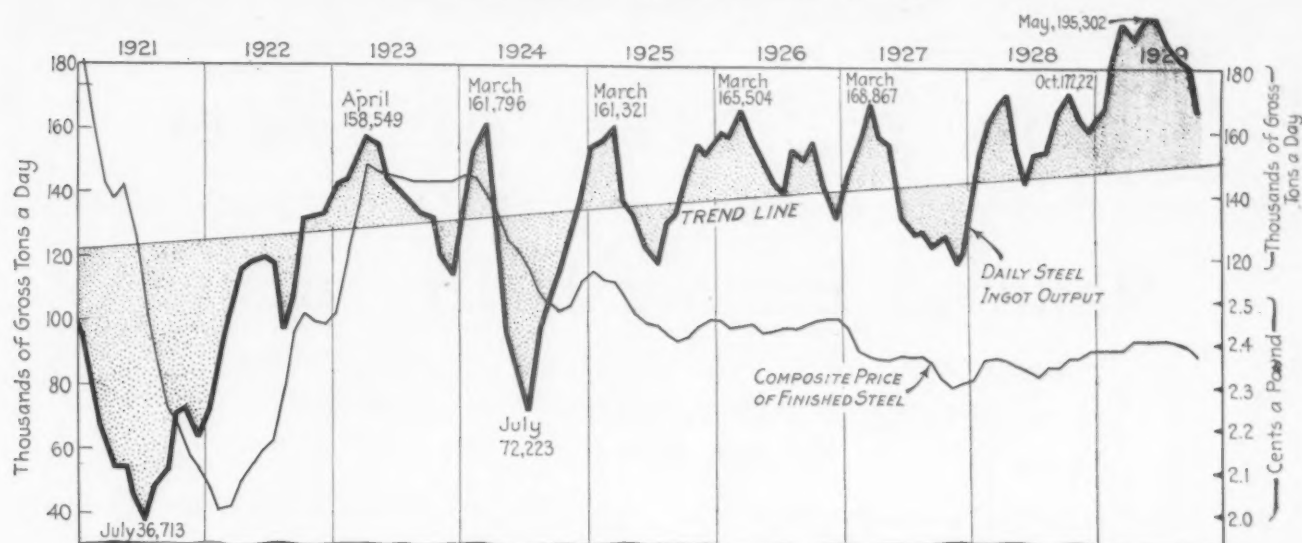
Electrochemists to Hear Address on Corrosion

Some of the fundamentals of corrosion, primarily from the viewpoint of the metallurgist, will be discussed by C. E. MacQuigg, manager, Union Carbide & Carbon Research Laboratories, Long Island City, N. Y., at the fall meeting of the New York Section of the American Electrochemical Society on Friday evening, Nov. 22. The meeting will be held at the Chemists' Club, 52 East Forty-second Street, New York, and will be preceded by a dinner at 6.45 p.m. The address will probably be supplemented by practical discussions from some of the leading metallurgists and electrochemists who have been interested in the solution of the corrosion problem.

Steel Founders to Meet

The Steel Founders' Society of America will hold its next regular meeting at Pittsburgh on Thursday, Dec. 12. This organization will also hold a regular meeting during the week of May 12, 1930, in Cleveland at the time the American Foundrymen's Association is having its annual convention there. Office of the society is at 932 Graybar Building, New York.

October Brings the Curve of Ingot Output Close to the Level of January, or More than 10 Per Cent Above Normal. Finished steel prices are about on parity with those a year ago



October Steel Ingot Output High

Ten Months' Production Exceeds Any Full Year Save 1928—Month's Daily Average Now Down Nearly to January Level

OCTOBER, with 27 working days, produced a tonnage of steel ingots slightly above September, with 25 working days. It brought the 10 months' total to a point nearly 15 per cent above the 10 months' output of 1928. This total for 10 months, in round numbers 47,755,000 gross tons, exceeds that for every full year save 1928.

The statistics are those of the American Iron and Steel Institute, and

the calculations for the industry as a whole are based on the institute's returns from companies which made 94.51 per cent of the 1928 output. The accompanying table gives the figures for the past 22 months.

Last month there was a gain in output over September in Bessemer steel of about 1.4 per cent, which was not quite wiped out by the loss in the make of open-hearth steel. However, for the 10 months of this year the

open-hearth production was some 15 per cent ahead of the same period of 1928 and the Bessemer output about 12.7 per cent ahead.

Daily averages, figured by eliminating Sundays from each month, show 167,098 tons for October, or 7.4 per cent off from the 180,435 tons of September. From the high point of May, exceeding 195,000 tons, the average daily output has now dipped nearly to the level of last January.

Electric and crucible ingots are not included in the current totals. Production of these two types of steel last year averaged about 1480 tons a day. Some such amount would have to be added to the daily figures in the table to obtain the total ingot output of the country.

The diagram traces the course of ingot production and finished steel prices over the period from the beginning of 1921.

PRODUCTION OF OPEN-HEARTH AND BESSEMER STEEL INGOTS (GROSS TONS)

1928 Months	Reported by Companies Which Made 94.51 Per Cent of the Steel Ingots in 1928		Calculated Output of All Companies		No. of Working Days
	Open-Hearth	Bessemer	Monthly	Daily	
January	3,273,294	498,691	3,990,902	153,496	26
February	3,300,407	521,250	4,043,457	161,738	25
March	3,692,648	567,330	4,507,217	166,934	27
April	3,505,104	564,110	4,305,382	172,215	25
May	3,394,301	582,128	4,207,212	155,823	27
June	3,010,341	528,193	3,743,903	143,996	26
July	3,068,257	528,588	3,805,598	152,224	25
August	3,379,625	569,771	4,178,610	154,763	27
September	3,375,654	544,710	4,147,893	165,916	25
October	3,795,800	599,098	4,649,968	172,221	27
Ten months....	33,795,431	5,503,869	41,580,142	159,924	260
November	3,442,112	590,669	4,266,835	164,109	26
December	3,301,114	496,679	4,018,208	160,728	25
Total	40,538,657	6,591,217	49,865,185	160,338	311
1929					
January	3,694,218	549,616	4,490,354	166,309	27
February	3,599,224	489,279	4,326,000	180,250	24
March	4,183,869	596,691	5,058,258	194,548	26
April	4,026,576	640,351	4,938,025	189,924	26
May	4,276,186	707,484	5,273,167	195,302	27
June	3,990,798	622,585	4,881,370	195,255	25
July	3,922,532	649,950	4,838,093	186,080	26
August	3,988,729	668,023	4,927,258	182,491	27
September	3,627,639	635,593	4,510,879	180,435	25
October	3,619,432	644,528	4,511,650	167,098	27
Ten months....	38,929,203	6,204,100	47,755,054	183,673	260

Milwaukee Sheet Plant Makes Record

All previous shipping and production records were broken by the Inland Steel Co. of Wisconsin in October, when 7398 tons of finished material was turned out. This exceeded the August output of 7142 tons, the previous high mark.

Up to Oct. 31, this year, 2000 more tons had been produced than in all of 1928. A full time schedule is being maintained at the present time. The greater part of the sheet steel turned out goes to Wisconsin and Milwaukee industries.

Iron and Steel Markets

Railroad Buying Is Impressive

Large Orders for Rails and Equipment Placed As Caution

Spreads Among Other Buyers—Steel Production

Declines—Scrap Is Lower

HESITANCY is still marked among iron and steel buyers and both new business and production have undergone a further decline. In the main, apprehension regarding the consequences of the stock market collapse, rather than actual evidence of adverse effects, explains the attitude of the trade.

But this spirit is not universal. Railroad buying is conspicuously good and the requirements of farm equipment manufacturers continue to expand. Structural fabricating shops and shipyards, which are exceptionally well booked, are taking steel at a high rate. Manufacturers of steel pipe are bidding on an inquiry for 100,000 tons for a gas line to be laid by the Standard Oil Co. of California.

These indications of activity are counted on to restore general confidence and to release tonnage now held back. The present cautious policy of buyers is apparently not due to excessive inventories, because there is still pressure for deliveries against steel on order and suspensions of shipments are few and have come mainly from motor car builders.

The importance of railroad demand at this juncture is especially evident at Chicago, where 75 per cent of current specifications for finished steel are from the carriers and equipment builders. Rail buying came earlier than usual this year and much of the tonnage has been for fall shipment, tending to offset the reduced volume of business from other sources. The concentration of this rail tonnage, together with the large requirements of railroad car and locomotive builders, helps to explain the Steel Corporation's gain of 183,981 tons in unfilled orders in October.

The week's additions to rail bookings total 113,000 tons, of which 52,000 tons is for the Chicago & North Western, 23,000 tons for the Wabash, 15,000 tons for the Western Pacific, 8000 tons for the Kansas City Southern and the remainder miscellaneous lots. The Boston & Maine has entered the market for 10,000 tons, while the Southern Pacific is expected to take early action on its inquiry for 120,000 tons.

Freight cars ordered thus far in 1929 number 85,000, in addition to which railroads have placed 9000 cars with their own shops. Purchases for the year will probably run well over 100,000 cars, which would be the largest total since 1924. The Boston & Maine has bought 1500 cars, duplicating an order of a few weeks ago. The Union Tank Car Co. has purchased 1000. About 15,000 cars are pending, and additional inquiries for 20,000 cars are looked for before the end of the year. One large road has planned a three-year program, calling for the purchase of 10,000 steel box

cars a year. Figures on the first 10,000 will be asked early in 1930.

Steel ingot production has declined to 60 per cent in the Valleys and to 75 per cent at Pittsburgh and Chicago. Eastern mills are operating at 65 to 80 per cent, the latter rate being that of the leading independent.

Finished steel prices show the strain of reduced demand, although in some lines the market remains untested because of the dearth of new business. Galvanized sheets are more commonly available at 3.40c., Pittsburgh, a decline of \$2 a ton from the price heretofore quoted to others than jobbers. Sales of black sheets have been made at 2.70c., Pittsburgh, a concession of \$1 a ton, while blue annealed sheets, which have been subject to severe competition from the continuous mill product, are openly quoted by some producers at 2.25c., Pittsburgh, for No. 13 gage and at 2.10c. for No. 10. Plates at Chicago have declined to a position of parity with bars and shapes.

Scrap, feeling the effects of curtailed consumption, is generally weaker. Heavy melting grade is \$1 a ton lower at Pittsburgh and 50c. lower at Chicago.

Bookings in plates and shapes are important supports of mill operations in the East. Fabricating awards reported by the Structural Steel Board of Trade of New York for October were the second largest for any month on record, totaling 85,699 tons. Lettings reported from all districts this week aggregated 26,000 tons, which was slightly larger than the total for last week but below the average for the year.

In the pig iron market caution is as pronounced as among steel buyers. The prospect is that the beginning of next year will find melters with virtually no iron bought and producers with a minimum tonnage sold. Furnace stocks are low except in the Central West, where considerable deferred shipment iron, mainly for the automobile industry, is backing up. More surplus steel works iron is expected to reach the market and Alabama producers are not likely to abandon the Northern trade that they recently built up.

Steel ingot output in October, in terms of daily average, declined 7.4 per cent from the production of September. The rate, at 167,098 tons, was the lowest since January. October fell nearly 3 per cent below the corresponding month in 1928, being the first month of 1929 to have a smaller output than the same period last year.

THE IRON AGE composite prices are unchanged, pig iron at \$18.38 a ton and finished steel at 2.362c. a lb.

A Comparison of Prices

Market Prices at Date, and One Week, One Month and One Year Previous,
Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron, Per Gross Ton:					Finished Steel,				
	Nov. 12, 1929	Nov. 4, 1929	Oct. 15, 1929	Nov. 13, 1928		Nov. 12, 1929	Nov. 4, 1929	Oct. 15, 1929	Nov. 13, 1928
No. 2 fdy., Philadelphia.....	\$21.26	\$21.26	\$21.26	\$21.26	<i>Per Lb. to Large Buyers:</i>	Cents	Cents	Cents	Cents
No. 2, Valley furnace.....	18.50	18.50	18.50	17.50	Sheets, black, No. 24, P'gh....	2.75	2.75	2.75	2.75
No. 2 Southern, Cin'ti.....	17.69	17.69	17.19	19.94	Sheets, black, No. 24, Chicago	2.85	2.85	2.95	2.85
No. 2, Birmingham.....	14.50	14.50	14.50	16.25	dist. mill	3.40	3.50	3.50	3.50
No. 2 foundry, Chicago*.....	20.00	20.00	20.00	20.00	Sheets, galv., No. 24, P'gh....	3.60	3.60	3.60	3.60
Basic, del'd eastern Pa.	19.75	19.75	19.75	19.75	Sheets, galv., No. 24, Chicago	2.35	2.35	2.35	2.10
Basic, Valley furnace.....	18.50	18.50	18.50	17.50	dist. mill	2.45	2.45	2.45	2.20
Valley Bessemer, del'd P'gh..	20.76	20.76	20.76	20.01	Wire nails, Pittsburgh.....	2.40	2.40	2.45	2.55
Malleable, Chicago*.....	20.00	20.00	20.00	20.00	Wire nails, Chicago dist. mill	2.45	2.45	2.45	2.60
Malleable, Valley	19.00	19.00	19.00	18.25	Plain wire, Pittsburgh.....	2.40	2.40	2.40	2.40
Gray forge, Pittsburgh.....	19.76	19.76	19.76	18.76	Plain wire, Chicago dist. mill	2.45	2.40	2.40	2.45
L. S. charcoal, Chicago.....	27.04	27.04	27.04	27.04	Barbed wire, galv., P'gh....	3.05	3.05	3.10	3.20
Ferromanganese, furnace....	105.00	105.00	105.00	105.00	Barbed wire, galv., Chicago	3.10	3.15	3.15	3.25
					dist. mill	5.35	5.35	5.35	5.25
					Tin plate, 100 lb. box, P'gh..				
Rails, Billets, Etc., Per Gross Ton:					Old Material, Per Gross Ton:				
Rails, heavy, at mill.....	\$43.00	\$43.00	\$43.00	\$43.00	Heavy melting steel, P'gh....	\$16.75	\$17.25	\$17.25	\$17.25
Light rails at mill.....	36.00	36.00	36.00	36.00	Heavy melting steel, Phila....	15.00	15.50	15.50	15.50
Re-rolling billets, Pittsburgh..	35.00	35.00	35.00	33.00	Heavy melting steel, Ch'go....	13.25	13.75	14.25	14.50
Sheet bars, Pittsburgh.....	35.00	35.00	35.00	33.00	Carwheels, Chicago	14.00	14.00	14.00	14.25
Slabs, Pittsburgh	35.00	35.00	35.00	33.00	Carwheels, Philadelphia	15.50	16.50	16.50	16.50
Forging billets, Pittsburgh....	40.00	40.00	40.00	38.00	No. 1 cast, Pittsburgh.....	15.00	15.50	15.50	15.50
Wire rods, Pittsburgh.....	40.00	40.00	40.00	42.00	No. 1 cast, Philadelphia.....	16.00	16.00	16.00	16.25
	Cents	Cents	Cents	Cents	No. 1 cast, Ch'go (net ton)...	13.50	14.00	14.50	15.50
Sklp, grvd. steel, P'gh, lb....	1.85	1.85	1.85	1.90	No. 1 RR. wrot., Phila.	16.00	16.00	16.00	15.50
					No. 1 RR. wrot., Ch'go (net)	12.50	13.00	14.00	13.00
Finished Steel,					Coke, Connellsville, Per Net Ton at Oven:				
<i>Per Lb. to Large Buyers:</i>	Cents	Cents	Cents	Cents	Furnace coke, prompt.....	\$2.65	\$2.65	\$2.65	\$2.85
Bars, Pittsburgh	1.90	1.90	1.90	1.95	Foundry coke, prompt.....	3.75	3.75	3.75	3.75
Bars, Chicago	2.00	2.00	2.05	2.00	Metals,				
Bars, Cleveland	1.90	1.90	1.95	1.90	<i>Per Lb. to Large Buyers:</i>	Cents	Cents	Cents	Cents
Bars, New York.....	2.24	2.24	2.24	2.29	Lake copper, New York.....	18.12 1/2	18.12 1/2	18.12 1/2	16.12 1/2
Tank plates, Pittsburgh.....	1.90	1.90	1.95	1.90	Electrolytic copper, refinery..	17.75	17.75	17.75	15.75
Tank plates, Chicago.....	2.00	2.05	2.05	2.00	Tin (Stralts), New York....	39.37 1/2	40.12 1/2	42.25	50.12 1/2
Tank plates, New York.....	2.17 1/2	2.17 1/2	2.22 1/2	2.22 1/2	Zinc, East St. Louis.....	6.25	6.50	6.80	6.25
Structural shapes, Pittsburgh	1.90	1.90	1.90	1.90	Zinc, New York.....	6.60	6.85	7.15	6.60
Structural shapes, Chicago....	2.00	2.00	2.05	2.00	Lead, St. Louis.....	6.10	6.35	6.70	6.20
Structural shapes, New York..	2.14 1/2	2.14 1/2	2.14 1/2	2.19 1/2	Lead, New York.....	6.25	6.50	6.90	6.35
Cold-finished bars, Pittsburgh	2.30	2.30	2.30	2.20	Antimony (Asiatic), N. Y....	8.62 1/2	8.62 1/2	8.50	10.37 1/2
Hot-rolled strips, Pittsburgh.	1.90	1.90	1.90	1.90					
Cold-rolled strips, Pittsburgh	2.75	2.75	2.75	2.85					

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Steel Orders Drop Further—Ingot Operations Reduced Also—Scrap Prices Break Sharply

PITTSBURGH, Nov. 12.—While steel orders have dropped off sharply in the last two weeks, specifications are reaching Pittsburgh and nearby mills in fair amount. In some cases, the tonnages released are somewhat smaller than they have been, but in few, if any, instances have shipments been entirely suspended. The importance of prompt delivery is being emphasized continually, but mills are in a position to meet such requirements and are inclined to regard the urgency for delivery as definite proof of low consumer inventories.

The sudden decline in steel demand is directly traceable to the recent stock market break and, in the absence of reliable estimates of just what the future course of general business will be, the steel industry is concerned with evaluating the potentialities of the large steel-consuming groups.

It is believed by some that the effect of the reduced automobile production is receiving overemphasis at this time. The two largest makers of cars in the low-priced field both expect to step up their production within the next month and will probably end the year with fairly heavy schedules. In both cases the cars to be produced represent model changes and the future course of production on these cars will depend upon public demand. Other automobile makers will probably maintain a sharply curtailed output for the remainder of the year.

Additional steel purchases by the

railroads are not so certain, but car orders placed in the last 60 days have added a heavy tonnage to the backlogs of plate and sheet mills, against which shipment will be made well into the first quarter.

The agricultural implement industry continues to step up its production, and, as this is the season when peak production is reached, a good outlet for steel is promised. Implement makers generally feel that next year's demand from the farming industry has not been seriously impaired by recent financial happenings.

Shape and plate mills in this dis-

trict are still fairly well occupied, and large construction projects on which fabricators are working will continue to require considerable steel. The Jones & Laughlin Steel Corporation has recently taken an order for 7000 tons of sheet steel piling for the Bonnett-Carre spillway in the lower Mississippi Valley and this is considered a forerunner of large steel tonnages which will be required for flood prevention work in that part of the country.

The pipe business has been dull in the last two weeks, but the Standard Oil Co. of California is inquiring for 80,000 tons of gas pipe in the larger sizes. Both lap-weld and seamless mills have thus far been able to maintain a fairly good operating rate.

Steel ingot operations continue to decline, with the average for the Pittsburgh district now about 75 per cent of capacity. The Valleys are at about 60 per cent and mills down the Ohio River are at no higher a rate.

Finishing mills generally average about the same as open-hearths, but the sheet industry as a whole is not above 60 per cent, with the leading interest about 10 points higher.

Tin plate production coincides roughly with sheets, but the 1930 price will probably be announced this

week and mills will soon begin to step up production on anticipated tonnage for next year. Strip mills are engaged at about half their capacity.

Prices are not strong, and concessions are reported in nearly all the principal lines. Upon investigation, most of these reports seem to emanate from buyers of steel. The hesitancy of these companies to place orders other than with their regular sources of supply indicates that prices are not as demoralized as they might seem and, with only small tonnages to quote on, the incentive for shading is lacking.

Makers of wire and wire nails have reaffirmed present quotations for first quarter business. Bars, shapes and plates seem to be holding at 1.90c., Pittsburgh, although this figure is not being tested by large tonnages. The 3.40c., Pittsburgh, price on galvanized sheets, which heretofore has been given only to jobbers, is growing more general, but otherwise sheet prices are not quotably lower. Cold-finishing mills have revised their contracts to meet the \$2 a ton reduction announced last week. Strip prices are subject to some question, but are untested in a market of practically no buying.

Pig Iron.—Excepting a few sales of carload or slightly larger lots, this market is completely lifeless. Nevertheless, shipments are keeping up fairly well, and the leading merchant interest reports that its current output is all going into immediate consumption. Other merchant furnaces are piling very little iron, but two stacks are going out this week in order to keep stocks down. The Youngstown Sheet & Tube Co. is taking out one of its Hubbard furnaces, and one of the Shenango stacks is being banked. A large part of the output of both of these furnaces ordinarily goes to ingot mold plants, whose business has been sharply curtailed by reduced steel company operations. Prices are weak, but untested on large tonnages, with small lots bringing the full Valley furnace quotations of \$18.50 on foundry and basic iron and \$19 on malleable and Bessemer. The local mer-

chant furnace is quoting prices 50c. a ton higher.

Prices per gross ton, f.o.b. Valley furnace:	
Basic	\$18.50
Bessemer	19.00
Gray forge	18.00
No. 2 foundry	18.50
No. 3 foundry	18.00
Malleable	19.00
Low phos., copper free	27.00

Freight rate to Pittsburgh or Cleveland district \$1.76.

Prices per gross ton, f.o.b. Pittsburgh district furnace:

Basic	\$19.00
No. 2 foundry	19.00
No. 3 foundry	18.50
Malleable	19.50

Freight rates to points in Pittsburgh district range from 63c. to \$1.13.

Semi-Finished Steel.—Shipments of crude steel are lighter than they were during the greater part of October, as non-integrated steel companies are anxious to keep stocks at a minimum. Their operations are also rather light. Steel companies normally have large stocks of billets, slabs and sheet bars, and decreases in ingot production are being made in some plants to bring output in line with the lowest absolute needs. Prices are nominal, but the market on sheet bars, slabs and billets is still quotable at \$35, Pittsburgh or Youngstown. Some users have contracts at this price, while large buyers are enjoying the usual differentials. Occasional sales of forging billets are reported, and the \$40 price is holding on such transactions. Wire rods are also quotable at \$40, Pittsburgh or Cleveland. Rod shipments are declining, as the requirements of bolt and nut makers are less than they were.

Bars, Shapes and Plates.—Demand for the heavy hot-rolled products leaves a good deal to be desired, but plate and shape mills are well engaged and extended rollings for large projects promise to hold output at close to the present level over the remainder of the year. Consumption of structural shapes by local fabricators is steady, and, while awards in the last two or three weeks have tended to slump, backlogs are satisfactory. Plate mills are not yet receiving specifications from the car builders in the amounts that had been

expected, but, with freight cars on order approaching the highest total of the year, heavy specifications from this source are certain to appear. Shops served by Pittsburgh mills are booked for three or four months and reports persist that more large orders will be placed before the end of the year. Barge builders are now making deliveries regularly of barges booked early in the year and are reaching the point where they need additional orders. However, the shortage of barges on the rivers is self-evident and a number of interests are engaged in the formation of new lines which will take care of the growing river commerce. Railroads are mentioned as being interested in some of these projects and it seems certain that the barge business will benefit by this cooperative attitude. Bar mills are running at reduced rates and demand is not improving. The cold-finishing mills are taking a comparatively small percentage of their usual tonnage. Makers of farm implements are increasing their requirements, and builders of machinery and tools are still fairly large users. Prices are unchanged at 1.90c., Pittsburgh, on bars, shapes and plates, with occasional small lots bringing \$1 a ton more.

Rails and Track Supplies.—Rail mill operations continue to improve and, as rail shipments gain, specifications for track accessories grow heavier. The Baltimore & Ohio has not yet made known its 1930 requirements for rails and track supplies, but most of the other Eastern roads have placed their business. Demand for light rails is keeping up and is particularly good in some of the coal regions where business is better than usual this year.

Wire Products.—With automobile and automotive parts makers taking only small tonnages, shipments of manufacturers' wire are less than they were during the corresponding October period. Other wire consumers are still taking their usual tonnage, but business is far from good, and demand from the jobbers is strictly of a hand-to-mouth character, involving very small lots. Prices seem to

THE IRON AGE Composite Prices

Finished Steel

Nov. 12, 1929, 2.362c. a Lb.

One week ago.....	2.362c.
One month ago.....	2.369c.
One year ago.....	2.369c.
10-year pre-war average.....	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products make 87 per cent of the United States output of finished steel.

	High	Low
1929	2.412c., April 2;	2.362c., Oct. 29
1928	2.391c., Dec. 11;	2.314c., Jan. 3
1927	2.453c., Jan. 4;	2.293c., Oct. 25
1926	2.453c., Jan. 5;	2.403c., May 18
1925	2.560c., Jan. 6;	2.396c., Aug. 18

Pig Iron

Nov. 12, 1929, \$18.38 a Gross Ton

One week ago.....	\$18.38
One month ago.....	18.29
One year ago.....	18.50
10-year pre-war average.....	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High	Low
1929	\$18.71, May 14;	\$18.25, Aug. 27
1928	18.59, Nov. 27;	17.04, July 24
1927	19.71, Jan. 4;	17.54, Nov. 1
1926	21.54, Jan. 5;	19.46, July 13
1925	22.50, Jan. 13;	18.96, July 7

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel	
	Base per Lb.
F.o.b. Pittsburgh mill.....	1.90c.
F.o.b. Chicago.....	2.00c.
Del'd Philadelphia.....	2.22c.
Del'd New York.....	2.24c.
Del'd Cleveland.....	1.90c.
F.o.b. Cleveland.....	1.90c.
F.o.b. Lackawanna.....	2.00c.
F.o.b. Birmingham.....	2.10c.
C.i.f. Pacific ports.....	2.35c.
F.o.b. San Francisco mills.....	2.35c.

Billet Steel Reinforcing	
F.o.b. Pittsburgh mills, 40, 50, 60-ft.....	2.05c.
F.o.b. Pittsburgh mills, cut lengths.....	2.30c.
F.o.b. Birmingham, mill lengths.....	2.10c.

Rail Steel	
F.o.b. mills, east of Chicago dist.....	1.90c.
F.o.b. Chicago Heights mill.....	1.95c.
Del'd Philadelphia.....	2.27c.

Iron	
Common iron, f.o.b. Chicago.....	2.00c.
Refined iron, f.o.b. P'gh mills.....	2.75c.
Common iron, del'd Philadelphia.....	2.12c.
Common iron, del'd New York.....	2.14c.

Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mill.....	1.90c.
F.o.b. Chicago.....	2.00c.
F.o.b. Birmingham.....	2.10c.
Del'd Cleveland.....	2.09c. to 2.14c.
Del'd Philadelphia.....	2.10c. to 2.15c.
F.o.b. Coatesville.....	2.00c. to 2.05c.
F.o.b. Sparrows Point.....	2.00c. to 2.05c.
F.o.b. Lackawanna.....	2.00c. to 2.05c.
Del'd New York.....	2.17½c. to 2.22½c.
C.i.f. Pacific ports.....	2.25c. to 2.35c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mill.....	1.90c.
F.o.b. Chicago.....	2.00c.
F.o.b. Birmingham.....	2.10c.
F.o.b. Lackawanna.....	2.05c.
F.o.b. Bethlehem.....	2.05c.
Del'd Cleveland.....	2.09c. to 2.14c.
Del'd Philadelphia.....	1.96c. to 2.06c.
Del'd New York.....	2.14½c.
C.i.f. Pacific ports.....	2.35c.

Hot-Rolled Hoops, Bands and Strips

	Base per Lb.
6 in. and narrower, P'gh.....	2.00c.
Wider than 6 in., P'gh.....	1.90c.
6 in. and narrower, Chicago.....	2.20c.
Wider than 6 in., Chicago.....	2.10c.
Cooperage stock, P'gh.....	2.20c.
Cooperage stock, Chicago.....	2.30c.

Cold-Finished Steel

	Base per Lb.
Bars, f.o.b. Pittsburgh mill.....	2.20c.
Bars, f.o.b. Chicago.....	2.20c.
Bars, Cleveland.....	2.20c.
Bars, Buffalo.....	2.20c.
Shafting, ground, f.o.b. mill.....	2.55c. to 3.50c.
Strips, P'gh.....	2.75c.
Strips, Cleveland.....	2.75c.
Strips, del'd Chicago.....	3.05c.
Strips, Worcester.....	2.90c.
Fender stock, No. 20 gage, Pittsburgh or Cleveland.....	4.25c.

*According to size.

Wire Products

(Carload lots, f.o.b. Pittsburgh and Cleveland, to jobbers and retailers.)

	Base per Keg
Wire nails.....	\$2.40 to \$2.50
Galvanized nails.....	4.40 to 4.50
Galvanized staples.....	3.10 to 3.20
Polished staples (per lb.).....	2.85c. to 2.95c.
Cement coated nails.....	\$2.40 to \$2.50

	Base per 100 Lb.
Bright plain wire, No. 6 to No. 9 gage.....	\$2.40 to \$2.50
Annealed fence wire.....	2.55 to 2.65
Spring wire.....	3.50 to 3.60
Gal'd wire, No. 9.....	3.00 to 3.10
Barbed wire, gal'd.....	3.05c. to 3.15c.
Barbed wire, painted.....	2.80c. to 2.90c.
Woven wire fence (per net ton to retailers).....	\$65.00

Cut Nails

	Per 100 Lb.
Carloads, Wheeling, Reading or Northumberland, Pa.....	\$2.70
Less carloads, Wheeling or Reading.....	2.80

Light Plates

No. 10, blue annealed, f.o.b. P'gh.....	2.10c. to 2.20c.
No. 10, blue annealed, f.o.b. Chicago dist.....	2.30c.
No. 10, blue annealed, del'd Phila.....	2.42c. to 2.52c.
No. 10, blue annealed, B'ham.....	2.35c.

Sheets

Blue Annealed	
	Base per Lb.
No. 13, f.o.b. P'gh.....	2.25c. to 2.35c.
No. 13, f.o.b. Chicago dist.....	2.45c.
No. 13, del'd Philadelphia.....	2.57c. to 2.67c.
No. 13, blue annealed, B'ham.....	2.50c.

Box Annealed, One Pass Cold Rolled	
No. 24, f.o.b. Pittsburgh.....	2.75c.
No. 24, f.o.b. Chicago dist. mill.....	2.85c. to 2.95c.
No. 24, del'd Philadelphia.....	3.07c.
No. 24, f.o.b. Birmingham.....	3.00c. to 3.10c.

Metal Furniture Sheets	
No. 24, f.o.b. P'gh.....	4.10c.

Galvanized	
No. 24, f.o.b. Pittsburgh.....	3.40c. to 3.50c.
No. 24, f.o.b. Chicago dist. mill.....	3.60c.
No. 24, del'd Cleveland.....	3.59c. to 3.69c.
No. 24, del'd Philadelphia.....	3.82c. to 3.92c.
No. 24, f.o.b. Birmingham.....	3.75c.

Tin Mill Black Plate	
No. 28, f.o.b. Pittsburgh.....	2.90c. to 3.00c.
No. 28, f.o.b. Chicago dist. mill.....	3.00c. to 3.10c.

Automobile Body Sheets	
No. 20, f.o.b. Pittsburgh.....	4.00c.

Long Ternes	
No. 24, 8-lb. coating, f.o.b. mill.....	3.90c. to 4.00c.

Vitreous Enameling Stock	
No. 24, f.o.b. Pittsburgh.....	3.90c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills.....	\$5.35
Standard cokes, f.o.b. Gary.....	5.45

Terne Plate

(F.o.b. Morgantown or Pittsburgh)	
(Per Package, 20 x 28 in.)	
8-lb. coating I.C.\$11.20	25-lb. coating I.C.\$16.70
15-lb. coating I.C. 14.00	30-lb. coating I.C. 17.75
20-lb. coating I.C. 15.30	40-lb. coating I.C. 19.85

Alloy Steel Bars

(F.o.b. makers' mill)	
Alloy Quality Bar Base, 2.65c. to 2.75c. per Lb.	Alloy Differential
S.A.E. Series	
2000 (¼% Nickel).....	\$0.25
2100 (1½% Nickel).....	0.55
2300 (3½% Nickel).....	1.50
2500 (5% Nickel).....	2.25
3100 Nickel Chromium.....	0.55
3200 Nickel Chromium.....	1.35
3300 Nickel Chromium.....	3.80
3400 Nickel Chromium.....	3.20
4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum).....	0.50
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum).....	0.70
4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel).....	1.05
5100 Chromium Steel (0.60 to 0.90 Chromium).....	0.35
5100 Chromium Steel (0.80 to 1.10 Chromium).....	0.45
5100 Chromium Spring Steel.....	0.20
6100 Chromium Vanadium Bars.....	1.20
6100 Chromium Vanadium Spring Steel.....	0.95
9250 Silicon Manganese Spring Steel (fats).....	0.25
Rounds and squares.....	0.50
Chromium Nickel Vanadium.....	1.50
Carbon Vanadium.....	0.95

Above prices are for hot rolled steel bars, forging quality. The differential for cold-drawn bars is ¾c. a lb. higher, with standard classification for cold-finished alloy steel bars applying. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis.

Billets under 4 x 4 in. carry the steel bar base. Slabs with a sectional area of 16 in. or over carry the billet price. Slabs with sectional area of less than 16 in. or less than 2½ in. thick, regardless of sectional area, take the bar price.

Rails

	Per Gross Ton
Standard, f.o.b. mill.....	\$43.00
Light (from billets), f.o.b. mill.....	26.00
Light (from rail steel), f.o.b. mill.....	34.00
Light (from billets), f.o.b. Ch'go mill.....	26.00

Track Equipment

	Base per 100 Lb.
Spikes, ¾ in. and larger.....	\$2.80
Spikes, ½ in. and smaller.....	2.80
Spikes, boat and barge.....	3.00
Tie plate, steel.....	2.15

Angle bars.....	\$2.75
Track bolts, to steam railroads.....	\$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count.....	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld	
Inches	Steel Black Galv. Iron Black Galv.
1½.....	45 19½ 1½ and ¾ +11 +36
1½ to 2.....	51 25½ 2 23 5
2.....	56 42½ 2½ 28 11
2½.....	60 48½ 1 and 1½ 31 15
1 to 3.....	62 50½ 1½ and 2 35 18

Lap Weld	
2.....	55 43½ 2 23 9
2½ to 6.....	59 47½ 2½ to 3½ 28 13
7 and 8.....	56 43½ 4 to 6..... 30 17
9 and 10.....	54 42½ 7 and 8..... 29 16
11 and 12.....	53 40½ 9 to 12..... 26 11

Butt Weld, extra strong, plain ends	
¾.....	41 24½ 1½ and ¾ +13 +48
1 to 1½.....	47 30½ 2 23 7
1½.....	53 42½ 2½ 28 12
2.....	58 47½ 1 to 2..... 34 18
1 to 1½.....	60 49½
2 to 3.....	61 50½

Lap Weld, extra strong, plain ends	
2.....	53 42½ 1½ 29 13
2½ to 4.....	57 46½ 2½ to 4..... 34 20
4½ to 6.....	56 45½ 4½ to 6..... 33 19
7 to 8.....	52 39½ 7 and 8..... 31 17
9 and 10.....	45 32½ 9 to 12..... 21 8
11 and 12.....	44 31½

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel	
2 in. and 2½ in.....	38
2½ in.—2¾ in.....	46
3 in.....	52
3½ in.—3¾ in.....	54
4 in.....	57
4½ in. to 6 in.....	46

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts: Lap Welded Steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload, 4 points under base and two fives. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five.

Standard Commercial Seamless Boiler Tubes

Cold Drawn	
1 in.....	61
1½ to 1¾ in.....	53
1¾ in.....	37
2 to 2½ in.....	32
2½ to 2¾ in.....	40

Hot Rolled	
2 and 2½ in.....	38
2½ and 2¾ in.....	46
3 in.....	52

Beyond the above base discounts a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb., base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb., base discounts are reduced 6 points, with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage take the mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base (carloads).....	55
Carbon, 0.30% to 0.40%, base.....	50
Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.	

be much better, with both wire nails and plain wire quotable at 2.50c., Pittsburgh, in carload lots to the trade, while jobbers are getting the usual \$2 a ton concession. Manufacturers' wire is quoted at 2.40c., Pittsburgh.

Tubular Goods.—The Standard Oil Co. of California has come into the market for 80,000 tons of 20, 22, 24 and 26-in. line pipe which will be required for a gas line running from the California gas field into San Francisco. Other than this the line pipe business is quiet. The projected gas line from the Texas fields into Chicago seems to have been postponed for the time being. Other lines of pipe are also inactive, and demand has weakened perceptibly during the last two weeks. In the case of standard butt-weld pipe, this decline is seasonal. The oil country is still disturbed by numerous conservation projects, some of which are expected to be of considerable benefit to the industry. Advanced prices on black and galvanized steel butt-welded pipe have been adopted by all producers who had previously granted concessions, the extra 2½ per cent supplementary discount having been withdrawn on all business.

Sheets.—This market is now facing seasonal curtailment in the requirements of a few large consuming industries as well as greatly reduced buying from the automobile makers. On the other hand, agricultural implement companies are regularly increasing their specifications and have given no indication of a belief that their next year's business will not be fully up to the high levels of the last two years. Car builders are also showing added interest in their sheet purchases, but have not yet released rolling orders on the bulk of the ton-

nage which is expected to reach sheet mills by the first of the year. The Ford Motor Co. has not yet completed its model revisions and its sheet orders are being delayed. Other makers of automobiles in the low-priced field are also postponing their commitments and companies which had planned improved output in November have curtailed production instead. This condition has naturally influenced the sheet business adversely. Demand for galvanized sheets has also declined as the roofing business closes its active season. Makers of electric refrigerators have become less important consumers, their season reaching its height in midsummer. One of the few industries which continues its heavy demand for sheets is the metal furniture business. Prices show no strength. On black sheets, most mills are quoting 2.75c., Pittsburgh, but sales have been made at 2.70c. The 3.40c. price on galvanized sheets, which has until recently been extended only to jobbers, is now applying on a growing number of sales to consumers. Some mills are openly seeking business in blue annealed at 2.10c. for the No. 10 gage and 2.25c. for the No. 13 gage.

Tin Plate.—Business is dormant, but, as the price for 1930 may be announced before the end of the week, it will not be long before specifications for next year's tonnage begin to reach the mills. Operations of the leading interest have dropped under 70 per cent of theoretical capacity for the first time in many months and the average for the independents is not higher than 60 per cent.

Strip Steel.—Demand for hot and cold-rolled strip steel is extremely dull and the industry's operating rate is not much above 50 per cent of capacity. Occasionally, specifications are sufficient for a slightly higher rate for a short time, but no general improvement is reported. The Chevrolet Motor Co. is soon expected to make known its requirements for the remainder of the year, but other motor companies are cautious buyers and the same is true of the parts makers. Prices are not quotably lower, although occasionally they are subject to shading. On hot-rolled material, the usual price is 2c., Pittsburgh, for material less than 6 in. wide and 1.90c., for 6 in. and wider. Cold-rolled strip is quoted at 2.75c., Pittsburgh or Cleveland.

Cold-Finished Steel Bars and Shafting.—Mills have marked down contracts on cold-finished steel bars to 2.20c., Pittsburgh, effective Nov. 1, and new business is being taken at that figure. The \$2 a ton reduction did not stimulate buying, but a steady flow of light specifications is still reaching the mills, assuring a constant though light operating rate.

Coal and Coke.—Weakness and inactivity are the prominent characteristics of this market. Furnace coke is occasionally bringing \$2.75 a ton,

Connellsville, but \$2.65 applies on all sizable tonnages and lower prices have been quoted. Production is still being curtailed in the Connellsville region. Domestic coke has not developed much life, but cold weather would undoubtedly stimulate business. Shipments of foundry coke to steel foundries are holding up, but tonnage going to other plants is only fair. The coal business seems to be slightly better than it was at this time last year, but industrial consumption is constantly decreasing and the movement to the Lakes is about ended for this year.

Old Material.—After maintaining some semblance of strength for two or three weeks, the scrap market in this district has broken sharply. The Pennsylvania Railroad steel brought from \$16.50 to \$17 last week, and, although this must be considered the market on No. 1 heavy melting steel in the absence of other transactions, it is generally admitted that further decline in values cannot be avoided. With the possible exception of the blast furnace grades, all items on the list are off about 50c. a ton, as compared with last week. Machine shop turnings are weak as the principal consumer is expected soon to hold up shipments. Specialties are also quotably lower at \$20 to \$20.50, but are strong at this range in contrast with the weakness of other grades. Hold-ups continue at several important consuming points and others plan restricted shipments. Dealers have practically exhausted old orders on which they have been shipping for the last two or three months, and it would be difficult to say what price a mill might get which came into the market for a large tonnage of scrap.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Warehouse prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bars	3.25c.
Hoops	4.25c.
Black sheets (No. 24), 25 or more bundles	3.80c. to 3.90c.
Galv. sheets (No. 24), 25 or more bundles	4.45c. to 4.55c.
Light plates, blue annealed (No. 10), 1 to 24 plates	3.35c. to 3.45c.
Blue annealed sheets (No. 13), 1 to 24 sheets	3.50c. to 3.60c.
Galv. corrug. sheets (No. 28), per square	\$4.43
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count, 60 per cent off list	
Machine bolts, 100 count, 60 per cent off list	
Carriage bolts, 100 count, 60 per cent off list	
Nuts, all styles, 100 count, 60 per cent off list	
Large rivets, base per 100 lb.	\$3.50
Wire, black soft ann'd base per 100 lb	\$2.90 to 3.00
Wire, galv. soft, base per 100 lb.	2.90 to 3.00
Common wire nails, per keg	2.80 to 2.90
Cement coated nails, per keg	2.95 to 3.05

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	\$16.50 to \$17.00
No. 2 heavy melting steel	14.50 to 15.00
Scrap rails	15.50 to 16.00
Compressed sheet steel	16.25 to 16.75
Bundled sheets, sides and ends	15.00 to 15.50
Cast iron carwheels	15.00 to 15.50
Sheet bar crops, ordinary	18.00 to 18.50
Heavy breakable cast	11.50 to 12.00
No. 2 railroad wrought	16.50 to 17.00
Hvy. steel axle turnings	15.50 to 16.00
Machine shop turnings	11.00 to 11.50

Acid Open-Hearth Grades:	
Railr. knuckles and couplers	20.00 to 20.50
Railr. coil and leaf springs	20.00 to 20.50
Rolled steel wheels	20.00 to 20.50
Low phos. billet and bloom ends	21.00 to 21.50
Low phos. mill plates	21.00 to 21.50
Low phos. light grades	20.00 to 21.00
Low phos. sheet bar crops	21.00 to 21.50
Heavy steel axle turnings	15.50 to 16.00

Electric Furnace Grades:	
Low phos., punchings	19.00 to 19.50
Hvy. steel axle turnings	15.50 to 16.00

Blast Furnace Grades:	
Short shoveling steel turnings	12.00 to 12.50
Short mixed borings and turnings	12.00 to 12.50
Cast iron borings	12.00 to 12.50

Rolling Mill Grades:	
Steel car axles	21.00 to 21.50

Cupola Grades:	
No. 1 cast	14.50 to 15.50
Rails 3 ft. and under	18.50 to 19.50

Chicago

Steel Orders Largely Supported by Rails and Car Requirements—Miscellaneous Buyers are Cautious

CHICAGO, Nov. 12.—The bulk of support given to the local iron and steel market is coming from the railroads. Fully 50 per cent of the volume of specifications for finished steel was issued by car builders and another 25 per cent is accounted for by new releases for standard-section rails. Western railroads have made definite inquiries for over 12,000 cars and there is in prospect, in some cases from railroads that bought cars earlier in the year, new requests for prices on 13,000 cars.

Changes in other phases of business are having no adverse bearing on equipment purchase programs. One instance of this is shown by the fact that the St. Louis-San Francisco, which originally asked for bids Nov. 17, accepted figures on the 11th of this month. New rail contracts have reached an impressive tonnage.

Taken as a whole, consumers of steel are using extreme caution in making commitments even for immediate use. This is reflected in the proportionately small part of current specifications entered by miscellaneous users this week. In some cases, consumers have cut too close and have had to supplement recent orders.

A leading radio manufacturer stopped all production activities last week with the intention of not resuming them until about the first of the year. This drastic move has already been modified and output has been started on a one-third capacity basis.

Several automobile manufacturers which recently swung into heavy production with new models have cut schedules to avoid overstocking new cars.

Structural awards, though light in the immediate vicinity of Chicago, are in substantial tonnage in the Central and Western States. Agricultural implement manufacturers are maintaining a high rate of production.

Ingot output at Chicago mills has failed to hold, and the average now is about 75 per cent of capacity. No. 4 stack at Gary has been banked, leaving 24 furnaces in blast out of a total steel mill count of 36.

Ferroalloys.—This market is quiet and tonnages placed are of such character as to afford little or no test of current quotations.

Prices delivered Chicago: 80 per cent ferromanganese, \$112.56; 50 per cent ferrosilicon, \$83.50 to \$88.50; spiegeleisen, 19 to 21 per cent, \$39.76 to \$41.76.

Pig Iron.—Shipments of Northern iron have started to taper, but the rate is slow and as yet little opportunity has been afforded producers to enlarge furnace stocks that have been unusually small. Most users are showing caution both in making new commitments and in issuing releases against old contracts. Producers of Southern iron are taking a stand for higher prices. One furnace is said to have withdrawn all quotations and to have named prices at \$13.50 to \$14 a ton, Birmingham. Charcoal iron has moved in small lots at \$24 a ton, furnace. Prices for silvery show no recovery from the recent low point.

Sales this week have reaffirmed present quotations.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil.	1.75 to 2.25	\$20.00
N'th'n No. 1 fdy., sil.	2.25 to 2.75	20.50
Malleable, not over 2.25 sil.		20.00
High phosphorus		20.00
Lake Super. charcoal, sil.	1.50	27.04
So'th'n No. 2 fdy. (all rail)		\$19.01 to 19.51
Low phos., sil. 1 to 2, copper free		29.50
Silvery, sil. 8 per cent		\$28.79 to 29.79
Bess. ferrosilicon, 14-15 per cent		46.29

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Sheets.—The effects of reduced tonnages of sheets released a week ago are now being felt at local mills, which have curtailed output to an average rate of 75 per cent of capacity. In view of the current rate of specifications, it is doubtful in the minds of some producers that this new rate of output can be maintained unless incoming business increases at an early date. Prices in the local market are holding moderately well, though competition is becoming increasingly severe, and there is a growing urge on local producers to reach out into a wider territory for business which must be taken at prices below local quotations. Deliveries show marked improvement and rolling schedules are more flexible than in many weeks. Galvanized sheets may be had in two to three weeks and other hot mill commodities are being promised in 10 days to two weeks. The manufacturing

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforc'g bars, billet steel	1.90c. to 2.25c.
Reinforc'g bars, rail steel	1.85c. to 2.00c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons	3.60c.
Plats and squares	4.10c.
Bands (7/8 in. in Nos. 10 and 12 gages)	3.20c.
Hoops (No. 14 gage and lighter)	3.75c.
Black sheets (No. 24)	4.05c.
Galv. sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.35c.
Spikes, 1/2 in. and larger	3.55c.
Track bolts	4.55c.
Rivets, structural	4.00c.
Rivets, boiler	4.00c.
Per Cent Off List	
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, sq., tap or blank	60
Hot-pressed nuts, hex., tap or blank	60
No. 8 black ann'l'd wire, per 100 lb.	\$3.45
Com. wire nails, base per keg	\$2.75 to \$2.95
Cement c't'd nails, base per keg	2.75 to 2.95

trade is taking sheets at extremely close range. Some believe this to be partly a reflection of the approach of the inventory period. Shipments of sheets to jobbers show little variation from the rate maintained in October.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 2.85c. to 2.95c.; No. 24 galv., 3.65c.; No. 10 blue ann'l'd, 2.35c. Deliv'd prices at other Western points are equal to the freight from Gary, plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

Cast Iron Pipe.—Inquiries and orders from municipalities are few, and there is little prospect of an early revival. Private buying is confined to small and scattered lots, but it is hoped by the trade that large inquiries for 1930 delivery to public utilities will develop in the early part of December. Current transactions do not afford tests of prices at \$43.70 to \$45.70 a net ton, delivered, Chicago, for diameters 6 in. and over. Genoa, Neb., has placed 10,000 ft. of 8-in. pipe with an unnamed bidder. Frank Wilsey, Hammond, Ind., will lay 7000 ft. of 6 and 8-in. gas pipe at Lowell, Ind.

Prices per net ton, deliv'd Chicago: Water pipe, 6-in. and over, \$43.70 to \$45.70; 4-in., \$47.70 to \$49.70; Class A and gas pipe, \$3 extra.

Warehouse Business.—Orders received by warehouses continue to taper, but the rate downward is slow. In view of the total business already on books for this year and the general tendency at this time, warehouse operators do not expect that 1929 will show a volume of business equal to that of the previous year. Prices generally are steady, with the exception of quotations on nails.

Cold-Rolled Strips.—Prices have settled to 2.75c. a lb., Cleveland, or 3.05c., delivered, Chicago. New business is light and output is at the low point of the year.

Rails and Track Supplies.—New orders for standard-section rails total more than 80,000 tons. The Chicago & North Western has ordered 52,000 tons, of which 36,000 tons was taken by the Illinois Steel Co. and 16,000 tons by Inland Steel Co. The Western Pacific is reported to have placed 15,000 tons with the Colorado mill, and miscellaneous orders in the Chicago territory total 15,000 tons. A part of this last tonnage is an addition to a new contract and another part is tonnage which is being added to a 1929 rail contract. It is reported here that the Southern Pacific will buy its 120,000 tons of rails this week. It is expected that orders will be placed in Colorado and in the South. Local rail mill operations are steady, with sufficient tonnage lined up to sustain the current rate to the end of the year. Miscellaneous orders for track supplies total 6000 tons, the bulk of which is for immediate needs. Fresh inquiries total 20,000 tons for accessories that will go with 1930 rails now being rolled. Prices for tie plates are showing a variation of \$1.50 a ton, the range in quotations being \$41.50 a ton

to \$43. The lower prices are being quoted to meet competition which develops when the purchaser serves territory surrounding two steel producing centers. The light rail market is without feature.

Prices f.o.b. mill, per gross ton: Standard section open-hearth and Bess. rails, \$43; light rails, rolled from billets, \$36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.07½c. to 2.15c.; angle bars, 2.75c.

Reinforcing Bars.—Prices for reinforcing bars continue to drag bottom, with further weakness shown in quotations on rail steel. On attractive business new billet bars are commonly quoted at 1.90c. a lb., Chicago warehouse, and rail steel reinforcing bars can be had at 1.85c. a lb. Feeble attempts to bolster prices have been without effect. Shop backlogs are shrinking and operations by most bar benders are at a lower stage than at the beginning of the month. The credit situation is giving trouble, and sellers find collections considerably more difficult to make. Fresh inquiry is below normal for this time of the year.

Wire Products.—Demand from the manufacturing trade continues to grow lighter, and wire mill output has been cut to a range of 55 to 60 per cent of capacity. With open weather still prevailing over much of the country, the demand for wire goods by jobbers and retailers is heavier than usual at this time of the year. Shipment of electrical wires is steady except to manufacturers of radio equipment. Demand for wire rope is steady and order books for heavy electrical cables are well filled to the end of the year.

Plates.—Prices for this commodity have settled to a flat 2c. a lb., Chicago, except for small tonnages that are of the less desirable kind. Shipments have been cut rather sharply, owing in large measure to the lessened need of plates for the manufacture of steel pipe. A bright spot in this market is the demand for car material, which this week totaled 50 per cent of the aggregate of finished steel specifications. Much of the 85,000 to 100,000 tons of steel needed for the Santa Fe cars has been placed. Orders for tank plates are small, at not more than 1000 tons. Fresh inquiry from the Oklahoma fields is for 5000 tons in one lot. Deliveries are at close range and rolling schedules are flexible, so that most buyers' immediate needs can be met promptly. Pending railroad car business is moving slowly, but according to the view taken by the trade is steady.

Structural Material.—New contracts placed this week are largely for highway bridge work for erection at points widely scattered throughout the Western part of the country. Locally, there is little to brighten the outlook. New bids are being asked for the 5000 tons needed for a traction company's bridge at Indianapolis. Figures to be submitted this week are to

include prices for erection. Plans for the \$15,000,000 Chicago Postoffice are said to be nearing completion and soon will be submitted to Washington. Lake shore protection improvements, made necessary by the high water level in Lake Michigan, give promise of the use of much steel piling. Structural shapes are being quoted at 2c. a lb., Chicago.

Mill prices on plain material, per lb.: 2.00c. base, Chicago.

Bars.—Prices for bars have settled to the low figure of the range quoted a week ago. Mild steel bars will not bring above 2c. a lb., Chicago, except for the less desirable class of business. Specifications are lighter than a week ago and deliveries on most sizes are prompt. Common quotations for iron bars are 2c. a lb., Chicago. The bulk of new business, which is fairly steady in volume, is being placed by railroads and car builders. The alloy steel bar market is quiet, with prices untested at 2.65c. to 2.75c. a lb., base. New buying of rail steel bars is at close range, and the bulk of going tonnage is being taken at 1.90c. a lb., Chicago Heights. Specifications closely match shipments, which still afford double turn operations at local mills.

Bolts, Nuts and Rivets.—Specifications are a trifle lighter from builders of automobiles. Jobbers and manufacturers of farm implements find steady use for these commodities.

Coke.—Producers are being hard pressed for shipments of by-product foundry coke. Prices are steady at \$8 a ton, local ovens.

Old Material.—Prices for scrap iron and steel have given ground in the last week and the tendency in many grades, in which the supplies are well above consumption, is still downward. Heavy melting steel, on business that aggregated close to 15,000 tons, has been sold at \$14 a gross ton, delivered. Iron rails and 2-ft. steel rails are marked down \$1 a ton. The cast iron borings market is at a standstill, with brokers being able to draw freely against available supplies at 25c. a ton below their prices of a week ago. It is evident that most heavy tonnage users have of late been accumulating stocks and their commitments are ample for immediate needs. Shipments of heavy melting steel to mills are about 25 per cent of the normal flow at this time of the year, while borings and hydraulic bundles are moving in even lighter proportionate tonnage. Small users and melters of specialties are buying with greater care and at closer range and also at lower prices. Few speculative transactions are being made by brokers, who prefer at this time to trade on an even basis for tonnages which they feel they can ship in the very near future. Prices paid for railroad scrap show variation, but the general level is well below that of several weeks ago. When bidders wish to rush through tonnages on orders which they fear may be cancelled, going

prices to railroads are about equal to present market quotations. However, the bulk of tonnage is not for this purpose and prices generally are such that a fair margin of profit can be realized at the present market. Railroad scrap lists are impressive in aggregate tonnage. The Milwaukee road, the Chicago Great Western, Pere Marquette, Wabash, Rock Island and the Monon all have tonnages to sell.

Prices deliv'd Chicago district consumers:
Per Gross Ton

Basic Open-Hearth Grades:
Heavy melting steel.....\$13.25 to \$13.75
Shoveling steel.....13.25 to 13.75
Frogs, switches and guards,
cut apart, and misc. rails 14.00 to 14.50
Hydraul. compressed sheets 11.50 to 12.00
Drop forge flashings.....10.75 to 11.25
No. 1 busheling.....11.50 to 12.00
Forg'd cast and r'd steel
carwheels.....18.00 to 18.50
Railroad tires, charg. box
size.....18.00 to 18.50
Railroad leaf springs cut
apart.....18.00 to 18.50

Acid Open-Hearth Grades:
Steel couplers and knuckles 16.50 to 17.00
Coil springs.....19.00 to 19.50

Electric Furnace Grades:
Axle turnings.....12.75 to 13.25
Low phos. punchings.....15.25 to 15.75
Low phos. plates, 12 in.
and under.....15.25 to 15.75

Blast Furnace Grades:
Axle turnings.....11.50 to 12.00
Cast iron borings.....9.25 to 9.75
Short shoveling turnings...9.50 to 10.00
Machine shop turnings....7.00 to 7.50

Rolling Mill Grades:
Iron rails.....14.50 to 15.00
Rerolling rails.....15.50 to 16.00

Cupola Grades:
Steel rails less than 3 ft.. 16.50 to 17.50
Steel rails less than 2 ft.. 18.50 to 19.00
Angle bars, steel.....16.25 to 16.75
Cast iron carwheels.....14.00 to 14.50

Malleable Grades:
Railroad.....16.50 to 17.00
Agricultural.....14.50 to 15.00

Miscellaneous:
*Relaying rails, 56 to 60 lb. 23.00 to 25.00
*Relaying rails, 65 lb. and
heav.26.00 to 31.00

Per Net Ton
Rolling Mill Grades:
Iron angle and splice bars 15.00 to 15.50
Iron arch bars and trans-
oms.....17.50 to 18.00
Iron car axles.....25.50 to 26.00
Steel car axles.....16.00 to 16.50
No. 1 railroad wrought...12.50 to 13.00
No. 2 railroad wrought...11.75 to 12.25
No. 1 busheling.....9.00 to 9.50
No. 2 busheling.....7.00 to 7.50
Locomotive tires, smooth.. 14.50 to 15.00
Pipes and flues.....10.00 to 10.50

Cupola Grades:
No. 1 machinery cast....13.50 to 14.00
No. 1 railroad cast.....12.50 to 13.00
No. 1 agricultural cast...12.00 to 12.50
Stove plate.....12.25 to 12.75
Grate bars.....11.75 to 12.25
Brake shoes.....10.25 to 10.75

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Canadian Steel Is to Build Tin Plate Mill

The Canadian Steel Corporation, Ojibway, Ont., is contemplating the construction of a tin plate mill there to cost \$1,000,000, according to a statement by Ward B. Perley, president of the corporation. Mr. Perley said that the Canadian organization had been planning such a unit for some time. The Canadian plant is operating chiefly a wire mill.

New York

Structural Steel Tonnage in October a Record—Sheet Prices Weaker—Pig Iron Buyers Cautious

NEW YORK, Nov. 12.—Pig iron sales for the week totaled less than 4000 tons, reflecting the extreme caution now prevalent among buyers. Merchant furnaces are not burdened with stocks, but, with consumers staying out of the market, it is not unlikely that Jan. 1 will find most buyers without any iron bought and producers with very little iron sold. Melters are disposed to defer action on their needs both because of the uncertainties introduced by the stock market crash and the possibility of larger offerings of surplus steel company iron. Steel producers operated throughout the first eight months of the year with virtually no reserves of pig iron. Now that they have had an opportunity to replenish these reserves there is reason to expect that more of their iron will find its way into the market. It is easier to put out open-hearth furnaces than blast furnaces; hence pig iron production is not so quick to adjust itself to reduced steel-making requirements. There are also indications that Alabama furnaces will not abandon the Northern trade they recently built up without attempting to keep pace with competition. The condition that prompted their invasion of the North, i.e., a slump in the requirements of Southern cast iron pipe shops, has not changed for the better. The American Locomotive Co. has bought 500 tons of foundry iron from a Buffalo furnace for spot shipment to its Schenectady, N. Y., plant. The activity of the railroad equipment plants is one of the bright spots of the present situation. Melt generally is rather well maintained and there have been few suspensions of pig iron shipments. Here and there some of the smaller jobbing shops are reducing operations and one large New York State manufacturer making domestic appliances has curtailed foundry production. With inquiries few, prices are getting very little test. On Buffalo foundry iron, \$17.50, furnace, is still the usual minimum on No. 2 plain, although silicon differentials are occasionally waived on the higher grades. William R. Thropp & Sons, Trenton, N. J., are in the market for 200 tons of No. 2X.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil.	1.75
to 2.25	\$22.41 to \$22.91
*Buf. No. 2, del'd east.	
N. J.	20.78 to 21.28
East. Pa. No. 2 fdy., sil.	1.75 to 2.25
to 2.25	19.89 to 21.02
East. Pa. No. 2X fdy., sil.	2.25 to 2.75
to 2.75	20.39 to 21.52

Freight rates: \$4.91 from Buffalo, \$1.39 to \$2.52 from eastern Pennsylvania.

*Prices delivered to New Jersey cities having rate of \$3.28 a ton from Buffalo.

Finished Steel.—Orders for steel placed with local sales offices in the past week were generally in larger volume than in the previous week. While the steel demand is not active,

there has been a smaller decline in business than some had expected. The Bethlehem Steel Co. continues to operate at about 80 per cent, orders for structural steel, plates and rails accounting in large measure for the maintenance of this rate. The Fore River yard of the Bethlehem Shipbuilding Corporation now has every one of its ways occupied by ships in course of construction, the first time that this has happened in years. Considerable steel for these ships is being rolled by Bethlehem mills. Building construction in the New York district is taking steel in large volume. Although awards in the past week were in lesser aggregate volume than in preceding weeks, the mills have large orders for plain material on their books resulting from the record-breaking tonnage awarded in October. The Structural Steel Board of Trade of New York reports that October bookings by members and non-members of all types of work exclusive of civil engineering projects totaled 85,699 tons, as compared with 54,119 tons in September and 50,264 tons in October, 1928. Previous high monthly records this year were 74,566 tons in August and 72,003 tons in March. Only once since the Structural Steel Board of Trade was organized has the October record been surpassed and that was due to special circumstances. In November, 1925, the total was 112,000 tons. Price developments, particularly in sheets, tend toward weakness. Although most sellers are quoting and getting 2.75c. for black sheets, some sales have been made at \$1 a ton less. The 3.40c. price on galvanized sheets, hitherto rated as a special concession to jobbers, has been extended in many instances to manufacturing consumers. Blue annealed sheets, which have been subject to severe competition from the continuous mill product, are being openly quoted by some mills at 2.25c., Pittsburgh, for the No. 13 gage and at 2.10c. for No. 10, concessions of \$2 a ton from the prices which prevailed for many months. Throughout the steel list other prices are holding fairly well, although a quotation of 2c., Coatesville, on plates is becoming commoner, but at the same time the Eastern mills are also getting orders at 2.05c., Coatesville base.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.24c. to 2.29c.; plates, 2.17½c. to 2.22½c.; structural shapes, 2.14½c.; bar iron, 2.14c.

Reinforcing Bars.—The stock market crash has had no noticeable effect on reinforcing business and in the long run is expected to have a favorable influence. Numerous jobs that had been held on architects' boards pending an easing in money rates will probably now be released. Warehouse business is holding up and thus far this year has shown an appreciable

gain over the same period in 1928. Prices remain at 2.05c., New York.

Warehouse Business.—Demand for sheets continues fairly active, but prices are still subject to shading. Structural steel buying is light.

Cast Iron Pipe.—While Northern makers of pressure pipe are maintaining a fairly high rate of operation on the large sizes, tonnage is needed in pipe 12-in. and smaller. Certain

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars, small shapes	3.25c.
Iron bars	3.24c.
Iron bars, Swed. charcoal	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Cold-roll, strip, soft and quarter hard	5.15c. to 5.40c.
Hoops	4.25c.
Bands	3.75c.
Blue ann'd sheets (No. 10)	3.50c. to 3.90c.
Long terme sheets (No. 24)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galv. annealed	5.15c.
Tire steel, ½ x ½ in. and larger	3.40c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.75c.
Open-hearth spring steel, bases	4.50c. to 7.00c.
Machine bolts, cut threads:	Per Cent Off List
¾ x 6 in. and smaller	.60
1 x 30 in. and smaller	.50 to 50 and 10
Carriage bolts, cut thread:	
¾ x 6 in. and smaller	.60
¾ x 20 in. and smaller	.50 to 50 and 10
Coach screws:	
¾ x 6 in. and smaller	.60
1 x 6 in. and smaller	.50 to 50 and 10
Boiler Tubes—	Per 100 Ft.
Lap welded, 2-in.	\$17.33
Seamless steel, 2-in.	20.24
Charcoal iron, 2-in.	25.00
Charcoal iron, 4-in.	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
¾-in. butt.	46	29
¾-in. butt.	51	37
1-3-in. butt.	53	39
2½-6-in. lap.	48	35
7 and 8-in. lap.	44	17
11 and 12-in. lap.	37	12
Wrought Iron—		
¾-in. butt.	5	+19
¾-in. butt.	11	+ 9
1-1½-in. butt.	14	+ 6
2-in. lap.	5	+14
3-6-in. lap.	11	+ 6
7-12-in. lap.	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	\$6.45	\$6.20
Charcoal, per Box—	A	AAA
IC	\$9.70	\$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	\$10.00 to \$11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R.

	One Pass	Per Lb.
Nos. 18 to 20	3.75c. to 3.80c.	
No. 22	3.90c. to 3.95c.	
No. 24	3.95c. to 4.00c.	
No. 26	4.05c. to 4.10c.	
No. 28*	4.20c. to 4.25c.	
No. 30	4.45c. to 4.50c.	

Sheets, Galvanized

	Per Lb.
No. 14	4.20c. to 4.40c.
No. 16	4.15c. to 4.25c.
No. 18	4.20c. to 4.40c.
No. 20	4.30c. to 4.50c.
No. 22	4.40c. to 4.60c.
No. 24	4.65c. to 4.75c.
No. 26	4.90c. to 5.00c.
No. 28*	5.15c. to 5.25c.
No. 30	5.55c. to 5.65c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

Southern producers are barely able to maintain a low rate of operation and are seeking new business. Prices continue irregular, with most of the current small buying in this district at \$32 to \$33 a ton, f.o.b. foundry. No municipal inquiries are reported and not much buying from this source is expected until late this year or early in January.

Prices per net ton deliv'd New York:
Water pipe, 6-in. and larger, \$34.60 to \$36.60; 4-in. and 5-in., \$37.60 to \$39.60; 3-in., \$44.60 to \$46.60. Class A and gas pipe \$3 extra.

Coke.—Prices of standard furnace coke eased off slightly last week as a result of some substantial tonnages of this grade offered for prompt shipment at \$2.65 a net ton and less by an operator in the Connellsville district who had received a request for postponement of delivery on a contract with a large user. Special brands of beehive foundry coke are quoted at \$4.85 a net ton, ovens. By-product foundry coke is quoted at \$9 to \$9.40 a net ton, Newark or Jersey City, and \$10.06, New York or Brooklyn.

Old Material.—Dealers' buying prices on No. 1 heavy melting steel have been reduced to \$14.50 a ton, delivered eastern Pennsylvania, based on an order for upward of 10,000 tons at \$15, delivered Bethlehem, Pa.

Meanwhile, brokers with old contracts for No. 2 heavy melting steel, which they have not yet completed, are paying up to \$13.50 a ton, delivered, although most of the tonnage moving is at \$12.75 a ton, Harrisburg, Pa., and \$13 a ton, delivered Phoenixville, Pa. Specification pipe is off 50c. a ton, with dealers paying \$13.50 a ton, delivered. Most other grades have declined 25c. to \$1 a ton on the basis of recent purchases by brokers and a minimum volume of consumer buying.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel	\$11.00 to \$11.85
Heavy melting steel (yard)	8.00 to 9.50
No. 1 hvy. breakable cast	10.25 to 11.00
Stove plate (steel works)	8.00
Locomotive grate bars	8.25
Machine shop turnings	7.00 to 7.50
Short shoveling turnings	7.25 to 7.50
Cast borings (blast fur.	
or steel works)	7.00 to 7.50
Mixed borings and turnings	6.75 to 7.50
Steel car axles	16.75 to 17.25
Iron car axles	22.00 to 22.50
Iron and steel pipe (1 in. dia., not under 2 ft. long)	9.75
Forge fire	8.50 to 9.00
No. 1 railroad wrought	12.00 to 12.50
No. 1 yard wrought, long	11.00 to 11.50
Rails for rolling	12.00 to 12.50
Stove plate (foundry)	8.25 to 9.00
Malleable cast (railroad)	13.50 to 14.00
Cast borings (chemical)	9.00 to 9.50

Prices per gross ton, deliv'd local foundries:

No. 1 machry. cast	\$15.50 to \$16.00
No. 1 hvy. cast (columns, bldg. materials, etc.), cupola size	13.50 to 14.00
No. 2 cast (radiators, cast boilers, etc.)	13.00 to 13.50

of \$18.50, Cleveland, for foundry and malleable grades for out-of-town shipment and \$19, furnace, for local delivery. In Michigan, there is a spread of from \$19.50 to \$20.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25	\$19.50
S'th'n fdy., sil. 1.75 to 2.25	\$20.50 to 21.00
Malleable	19.50
Ohio silvery, 8 per cent.	28.00
Basic Valley furnace	18.50
Stand. low phos., Valley	26.50 to 27.00

Prices except on basic and low phosphorus are delivered Cleveland. Freight rates: 50c. from local furnaces; \$3 from Jackson, Ohio; \$6 from Birmingham.

Iron Ore.—Ore firms are cleaning up their shipments for the season, and the movement will be light the latter part of the month. Ore on Lake Erie docks Nov. 1 amounted to 6,365,342 tons, compared with 6,472,840 tons on the same date last year. Receipts at these docks for the season to Nov. 1 were 42,627,849 tons, compared with 33,343,785 tons during the same period last year. Shipments from Lake Erie docks to Nov. 1 were 30,886,416 tons, against 23,526,093 tons during the corresponding period in 1928. Receipts at Lake Michigan and other receiving ports other than Lake Erie ports until Nov. 1 were 17,105,832 tons, against 14,900,813 tons during the same period a year ago.

Semi-Finished Steel.—Specifications against contracts, which have been light for some time, show no improvement. Some of the mills would be glad to make sales, but there is no demand. The leading local producer continues to operate eight of its 14 open-hearth furnaces. Shipments are being made against \$35 contracts for sheet bars, billets and slabs.

Bars, Plates and Shapes.—Steel bars are in very light demand, and local mills are operating at not over 60 per cent of capacity. Plates are moving fairly well in small lots. Detroit will take bids this week for a pipe line requiring 1500 tons, cutting its original inquiry from 4500 tons, having decided to do only a portion of its pipe line extension work at present. Structural shapes are quiet, and there is not much building work up for figures. Inquiries are out for highway bridge work in Ohio, western New York and Pennsylvania requiring several hundred tons. While a 1.85c., Cleveland, price is occasionally reported on steel bars, 1.90c. is

Cleveland

Further Slowing Down in Steel Demand—Outlook in Automotive Industry Has Not Brightened

CLEVELAND, Nov. 12.—There was a further slowing down in the demand for finished steel the past week, and some of the mills again curtailed operations. The automotive industry continues to mark time and its view of the outlook is not very optimistic. Because of various unfavorable factors that have developed, the time that that industry expects a revival in production has now been extended until February.

Hesitancy prevails in the industry, and some of the motor car manufacturers that had planned to start manufacturing their new models this month apparently have not yet decided when they will go ahead. Shipments have been deferred on considerable steel for this industry scheduled for November delivery, although one maker of low-priced cars continues to take sheets for the manufacture of 160,000 cars according to its November-December schedule.

Motor car manufacturers are still confronted with unsold stocks of old models, which are moving very slowly, their sale having been seriously affected by the stock market collapse. Probably the brightest spot in the present unfavorable situation in respect to the motor car industry is that inventories are exceedingly low. This is also true of industries outside of the automotive field.

Consumers needing steel are ordering only in very small lots for immediate requirements. Hesitancy that prevails in the automotive industry has spread to other industries in the metal-working field, resulting in some curtailment in plant operations.

Pig Iron.—A little interest has developed in first quarter contracts, one producer having received inquiries during the week for a few lots aggregating 3000 tons for that delivery.

Current sales are light and confined mostly to small lots, coming from foundries that had not previously bought enough iron to carry them through the year. Sales by Cleveland interests during the week totaled 8700 tons, or slightly less than during the previous week. One producer has shipped a little more iron so far this month than during the corresponding period in October, but another reports a falling off in shipments this month. While there has been a slight increase in shipping orders from one or two automobile foundries, the movement of iron to this industry is still very light and considerable deferred shipment iron is backing up at the blast furnaces. There has also been a slowing down in shipments to other industries. The market is holding steady at regular quotations

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struc. shapes	3.00c.
Soft steel bars	3.00c.
Reinforc. steel bars	2.25c. to 2.50c.
Cold-fin. rounds and hex.	3.65c.
Cold-fin. flats and sq.	4.15c.
Hoops and bands, No. 12 to 14 in. inclusive	3.25c.
Hoops and bands, No. 13 and lighter	3.65c.
Cold-finished strip	5.95c.
Black sheets (No. 24)	3.70c. to 3.90c.
Galvanized sheets (No. 24)	4.60c. to 4.75c.
Blue ann'd sheets (No. 10)	3.25c.
No. 9 ann'd wire, per 100 lb.	\$2.65
No. 9 gal. wire, per 100 lb.	3.00
Com. wire nails, base per keg	2.65

*Net base, including boxing and cutting to length.

being maintained by most mills. Pressure is being encountered for concessions to 1.90c., Pittsburgh, on structural shapes and plates. However, the 1.95c. price is being pretty generally adhered to.

Sheets.—Mills entered very little tonnage during the week either in new business or in specifications against contracts. Automobile body sheets are the quietest item on the list. One automobile manufacturer sent out an inquiry during the week for a good-sized lot and later withdrew it. Independent mills have further reduced production and are operating at the most from 50 to 65 per cent. Mills making common black and galvanized sheets are running better than those that specialize on high-finished sheets. Orders are not of sufficient size to test prices. Black sheets are holding at 2.75c., Pittsburgh. Blue annealed sheets are not firm, concessions being made to 2.10c. for No. 10 and 2.25c. for No. 13. Galvanized sheets are generally quoted at 3.50c.

Strip Steel.—The tendency in the demand still appears to be downward, and little improvement is looked for until there is a revival in orders from the automotive industry. Operations are spotty. Some mills are running at about 50 per cent of capacity and others are near the closing down point. While hot-rolled strip is holding to regular quotations, it is not improbable that a good inquiry might bring out a concession. Shading to 2.65c., Cleveland, is reported occasionally on cold-rolled strip.

Warehouse Business.—Sales have fallen off in about all lines this month, as compared with the early part of October. This reflects a slowing down of consuming industries. Prices are well maintained. Jobbers have not followed the mills in making a \$2 a ton reduction on cold-finished steel bars and it seems improbable that a change will be made.

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, $\frac{1}{4}$ -in. and heavier.....	2.70c.
Plates, $\frac{3}{8}$ -in.	2.90c.
Structural shapes	2.70c.
Soft steel bars, small shapes, iron bars (except bands).....	2.80c.
Round-edge iron	3.50c.
Round-edge steel, iron finished $1\frac{1}{2}$ x $1\frac{1}{2}$ in.	3.50c.
Round-edge steel planished.....	4.30c.
Reinforce. steel bars, sq. twisted and deform.	2.60c. to 2.80c.
Cold-fin. steel, rounds and hex.	3.50c.
Cold-fin. steel, sqs. and flats.....	4.00c.
Steel hoops	3.55c.
Steel bands, No. 12 to $\frac{3}{8}$ -in. inclus.	3.30c.
Spring steel	5.00c.
*Black sheets (No. 24).....	3.90c.
†Galvanized sheets (No. 24).....	4.65c.
Light plates, blue annealed (No. 10)	3.25c.
Blue ann'd sheets (No. 13).....	3.40c.
Diam. pat. floor plates—	
$\frac{1}{4}$ -in.	5.30c.
$\frac{3}{8}$ -in.	5.50c.
Rails	3.20c.
Swedish iron bars.....	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.

†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

Bolts, Nuts and Rivets.—Bolt and nut orders so far in November have been in about the same volume as in October, which, because of the reduced orders from the automotive industry, was the poorest month of the year. Prices are being well maintained, although there is some shading on special bolts for the automotive industry. Rivet demand shows a slight gain over last month due to better orders from shipbuilders. The industry is operating at about 60 per cent of capacity.

Coke.—Mild weather has interfered with shipments of domestic coke and has checked new buying. Foundry coke is not moving very well owing to some curtailment by the foundry industry. Prices are unchanged. Ohio by-product foundry coke is quoted at \$8.25, ovens.

Old Material.—There has been further holding up of scrap shipments by Cleveland and Valley district consumers. Only one local mill is at present taking any scrap and that in steel-making grades in rather limited quantities. Inability to make shipments has driven dealers out of

the market and they are not buying scrap of any grade. The existing situation is reflected in a weak market. However, in the absence of transactions quotations are nominal.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel.....	\$14.50 to \$15.00
No. 2 heavy melting steel.....	14.25 to 14.50
Compressed sheet steel.....	14.75 to 15.25
Light bundled sheet stampings.....	12.00 to 12.50
Drop forge flashings.....	13.00 to 13.25
Machine shop turnings.....	10.00 to 10.25
Short shoveling turnings.....	11.50 to 12.00
No. 1 railroad wrought.....	13.50 to 14.00
No. 2 railroad wrought.....	16.00 to 16.50
No. 1 busheling.....	13.25 to 13.75
Pipes and flues.....	9.00 to 9.50
Steel axle turnings.....	12.50 to 13.00
Acid Open-Hearth Grades:	
Low phos., forging crops.....	17.75 to 18.00
Low phos., billet, bloom and slab crops.....	18.50 to 18.75
Low phos., sheet bar crops.....	18.00 to 18.50
Low phos., plate scrap.....	18.00 to 18.50
Blast Furnace Grades:	
Cast iron borings.....	10.50 to 11.00
Mixed borings and short turnings.....	10.50 to 11.00
No. 2 busheling.....	10.00 to 10.50
Cupola Grades:	
No. 1 cast.....	17.00 to 17.50
Railroad grate bars.....	11.00 to 12.00
Stove plate.....	12.00 to 12.50
Rails under 3 ft.....	18.50 to 19.50
Miscellaneous:	
Railroad malleable.....	18.00 to 18.50
Rails for rolling.....	16.25 to 16.50

Philadelphia

Steel Prices Lack Strength—Heavy Melting Scrap Declines—Pig Iron Market Quiet

PHILADELPHIA, Nov. 12.—Consumers of steel show no inclination to alter their attitude of delaying purchases to determine, if possible, what effect the unsettled stock market may have upon their business. Meanwhile, mill backlogs are steadily decreasing and operating rates of eastern Pennsylvania mills range from about 65 per cent to 80 per cent. Prices generally lack strength, but sellers are endeavoring to maintain the market on small tonnage buying, which constitutes most of the present business, offering concessions only to the larger, preferred buyers.

Eastern Pennsylvania shipbuilders are well engaged and are bidding on some new contracts for ship construction, but railroad buying is on a smaller scale than earlier in the fall. The Boston & Maine Railroad is expected to close shortly on 10,000 tons of 100-lb. and 130-lb. rails.

The pig iron market is quiet, and most prices of iron and steel scrap show a tendency toward further decline.

Pig Iron.—Foundry iron buying is limited to small lots, few consumers showing any desire to provide for their requirements beyond a few weeks. On such business, prices are being fairly well maintained at \$21, furnace, with only occasional small concessions in the immediate Philadelphia district. On business outside this territory, however, where competition is encountered from furnaces in other districts, concessions range up to several dollars a ton. The Baldwin Locomotive Works is in the market for 750 to 1000 tons of cylinder iron for delivery beginning the second week in December at the rate of 50 to 100 tons a week. The Newport News Shipbuilding & Dry Dock Co. is inquiring for a carload of No. 2X foundry iron for shipment before the end of the month. The Brooklyn Navy Yard is asking for 200 tons of low phosphorus iron, and the New York Air Brake Co., Watertown, N. Y., is in the market for 400 tons of malleable and 250 tons of No. 2 plain foundry

iron. The Virginia furnace, which has been offering foundry iron in the Cumberland Valley at competitive prices, has not closed any substantial business, as most consumers have already covered their requirements to the end of the year. Basic iron users in this district have not yet bought, but a Claymont, Del., mill has been obtaining prices. A Coatesville, Pa., consumer has about 3000 tons of Southern basic iron in transit by barge from the Birmingham district.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	\$21.26 to \$21.76
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.76 to 22.26
East. Pa. No. 1X.....	22.26 to 22.76
Basic (del'd east. Pa.).....	19.75 to 20.25
Gray forge	20.00 to 20.50
Malleable	21.25 to 21.75
Stand. low phos. (f.o.b. N. Y. State furnace)....	22.00 to 23.00
Con. br'g low phos. (f.o.b. furnace)	23.50 to 24.00
Va. No. 2 plain, 1.75 to 2.25 sil.	22.29
Va. No. 2X, 2.25 to 2.75 sil.	22.79

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to \$1.64 from eastern Pennsylvania furnaces; \$4.54 from Virginia furnaces.

Bars.—Buying is limited to occasional small lots of a carload or less. Since the reduction of price to 1.90c., Pittsburgh, or 2.22c. per lb., delivered Philadelphia, the market is being maintained, present orders being too small to bring any concession from this level.

Reinforcing Bars.—Some sizable tonnages of bars will be required for projects on which bids have been taken, but new business has been light. The price situation is unchanged, with billet steel bars quoted at 1.95c. to 2c., Pittsburgh, or 2.27c. to 2.32c., delivered Philadelphia, and usually no extra for cutting to length. Rail steel bars are quoted at 1.85c. to 1.95c., Franklin, Pa., and Tonawanda, N. Y., or 2.17c. to 2.27c., delivered Philadelphia, with no extra for cutting to length or bending.

Shapes.—Mills are still fairly well engaged and able to maintain fair operations, but the tonnage in the individual rollings is smaller than for some time. Prices show a slightly more definite trend toward a lower level, and one seller has been quoting 1.855c. per lb., Pencoyd, Pa., or 1.915c., delivered Philadelphia, on desirable business. On small lots, the market ranges up to 1.95c., Pencoyd, or 2.01c., Philadelphia. Bids were opened today on the general contract for the new convention hall in Philadelphia, which requires 7000 tons, and the low bidder for the building was McCloskey & Co., Philadelphia. The total bid was considerably in excess of the original estimate.

Plates.—Although 2c., Coatesville, Pa., or 2.10c., Philadelphia, is being quoted on plates, mills in this district are seeking to limit this concession to the more desirable orders, and are quoting 2.05c., Coatesville, or 2.15c., delivered Philadelphia, on the smaller lots, which represent a considerable part of present buying. Operating rates of plate mills are slightly better than the rates maintained by mills rolling other products, but the highest is not more than 75 per cent of capacity. Shipbuilding orders have provided some substantial tonnages on mill books and more business from this source is expected.

Sheets.—Operations of leading local consumers of sheets are still greatly restricted, but automobile body builders which have contracts with leading makers have recently been testing the market on blue annealed and high-finished sheets and expect to begin production of new models shortly. Radio manufacturers are entering their usual dull season and have curtailed their output accordingly. Sheet prices have been shaded on recent business, so that black sheets range from 2.70c. to 2.75c., Pittsburgh, or 3.02c. to 3.07c., Philadelphia, and galvanized are quoted at 3.40c., Pittsburgh, or 3.72c., Philadelphia. Blue annealed sheets have been sold at 2.25c., Pittsburgh, or 2.57c., Philadelphia, for No. 13 gage, and blue annealed plates at 2.10c., Pittsburgh, or 2.42c., Philadelphia, for No. 10 gage. Eastern Pennsylvania sellers are en-

deavoring to quote these prices only on the larger orders from automobile builders and other preferred buyers, maintaining 2.35c., Pittsburgh, for No. 13 gage sheets and 2.20c., Pittsburgh, for No. 10 gage plates, on small orders and the miscellaneous specifications of jobbers.

Imports.—In the week ended Nov. 9, a total of 3449 tons of pig iron arrived at this port, of which 1949 tons came from British India and 1500 tons from the United Kingdom. A total of 4650 tons of chrome ore was received from Portuguese Africa. Steel imports consisted of 11 tons of drill steel from Sweden and 4 tons of scrap from the United Kingdom.

Old Material.—No. 1 heavy melting steel has declined another 50c. a ton to \$15, delivered eastern Pennsylvania, following purchase of upward of 15,000 tons of this grade for delivery to Bethlehem, Steelton and Coatesville, Pa. Other grades of scrap are weaker. No. 2 automobile steel has been bought by a consumer at Pencoyd, Pa., at \$13.75 a ton, delivered, and specification pipe is off 50c. a ton, following purchase of a small tonnage at \$14, delivered by a Lebanon, Pa., user. A report that a Claymont, Del., mill bought a small tonnage of No. 1 steel is attributed to the fact that this consumer recently accepted shipments of steel by brokers with the price to be agreed upon when the mill was ready to buy. Settlement is understood to have been made for the total tonnage, which was small, at \$15.50 a ton, delivered.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	\$15.00 to \$15.50
Scrap T rails	14.50 to 15.00
No. 2 heavy melting steel	12.50 to 13.75
No. 1 railroad wrought	16.00 to 16.50
Bundled sheets (for steel works)	11.50
Hydraulic compressed, new	14.50 to 15.00
Hydraulic compressed, old	12.00 to 12.50
Machine shop turnings (for steel works)	11.50
Heavy axle turnings (or equiv.)	14.00 to 14.50
Cast borings (for steel works and roll. mill)	11.00 to 11.50
Heavy breakable cast (for steel works)	14.50
Railroad grate bars	12.00 to 12.50
Stove plate (for steel works)	12.00
No. 1 low phos., hvy., 0.04% and under	21.00 to 22.00
Couplers and knuckles	19.50 to 20.50
Roller steel wheels	19.50 to 20.50
No. 1 blast furnace scrap	10.50 to 11.00
Wrought iron and soft steel pipes and tubes (new specific.)	14.00
Shafting	19.00 to 19.50
Steel axles	22.50 to 23.00
No. 1 forge fire	13.50
Cast iron carwheels	15.50 to 16.00
No. 1 cast	16.00 to 16.50
Cast borings (for chem. plant)	14.50
Steel rails for rolling	16.50 to 17.00

National Steel Co. Is Incorporated

The National Steel Co., the organization recently formed by a merger of certain subsidiaries of the M. A. Hanna Co., Cleveland, and the Great Lakes Steel Corporation, Detroit, and the Weirton Steel Co., Weirton, W. Va., filed articles of incorporation in Delaware on Nov. 7.

The new company, which will have assets aggregating in excess of \$150,-

000,000, will be effected through the exchange of securities. The stock transfers are to be completed by Nov. 30. Properties involved in the merger will come under control of the new organization effective Dec. 1.

Lamson & Sessions Co. and Lake Erie Bolt Merge

Merger of the Lamson & Sessions Co. and the Lake Erie Bolt & Nut Co., Cleveland, has been approved by the directors of the two companies and shortly will be submitted to the stockholders for ratification. The combined business of the two companies is approximately \$10,000,000 a year.

Under the terms of the merger the capital stock of the Lamson & Sessions Co. will be changed to no par value from \$25 par and an increase authorized from 100,000 to 350,000 shares. There will be issued 172,500 shares to present shareholders of the Lamson & Sessions Co. in exchange for the present 100,000 shares and 70,000 shares to the stockholders of the Lake Erie company, one share to the latter for each share now held. In addition, Lamson & Sessions stockholders are to receive an extra cash dividend of \$1 a share on present capital stock. On completion of the merger the Lamson & Sessions Co. will have 242,500 shares of no par common stock outstanding and \$904,500 of 7 per cent preferred stock.

Westinghouse Radio Hour a Tribute to Steel

The steel industry was the subject of the first of a series of radio programs dedicated to the country's leading industries which are being broadcast by the Westinghouse Electric & Mfg. Co., East Pittsburgh, in an attempt to build up the good-will of the radio public for each particular industry. The series is being broadcast on Wednesday evenings at 7.30 over the country-wide network of the blue chain of the National Broadcasting Co., and other groups to be included are aviation, paper, food, textiles, pumping and irrigation and various phases of the electrical industry.

Detroit Scrap Prices Drop

DETROIT, Nov. 12.—Decided weakness in the market for old material has developed, declines in some instances running more than \$1 a ton. There is very little buying, and some steel companies have suspended shipments.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Hvy. melting and shov. steel	\$12.00 to \$13.00
Borings and short turnings	8.00 to 8.50
Long turnings	7.75 to 8.25
No. 1 machinery cast	12.50 to 13.00
Automobile cast	11.50 to 12.00
Hydraul. comp. sheets	12.00 to 12.50
Stove plate	9.00 to 9.50
New No. 1 busheling	11.00 to 11.50
Old No. 1 busheling	9.50 to 10.00
Sheet clippings	8.00 to 8.50
Flashings	10.50 to 11.00

Pacific Coast

Standard Oil of California Seeks 300 Miles of Pipe— Southern Pacific Rail Inquiry for 120,000 Tons

SAN FRANCISCO, Nov. 9 (*By Air Mail*).—The recent stock market break apparently has had little effect on the iron and steel industry on the Pacific Coast, as bookings for the week compare favorably with the weekly average of the year and inquiries include some heavy tonnages. The Southern Pacific Co. is in the market for 120,000 tons of rails, together with a heavy tonnage of tie plates, track bolts and track spikes. The Standard Oil Co. is taking bids on upward of 300 miles of gas pipe, with an estimated weight of about 100,000 tons.

Building activity is well sustained, as shown by permits issued during the past month, and, from present indications, construction will continue unabated during the remainder of the year.

Pig Iron.—Demand for pig iron continues spotty, most consumers having fair-sized stocks. No change in quotations has occurred.

Prices per gross ton at San Francisco:

*Utah basic	.....	\$25.00 to \$26.00
*Utah fdy., sil.	2.75 to	
3.25	.....	25.00 to 26.00
**Indian fdy., sil.	2.75 to	
3.25	.....	25.00 to 26.00

*Delivered San Francisco.

**Duty paid, f.o.b. cars San Francisco.

Bars.—Among the larger lettings of reinforcing steel bars was 363 tons for approaches for the West Spokane Street bridge, Seattle, placed with the Pacific Coast Steel Co., and 100 tons for an apartment house in Sacramento, Cal., booked by the Truscon Steel Co. Pending business calls for a fair-sized total and includes 800 tons for the Eleventh Street viaduct in Tacoma and 325 tons for a power house for the Lake Cushman dam project, Tacoma. Out-of-stock prices in San Francisco continue unchanged at 2.30c., base, on carload lots and at 2.60c. on smaller quantities. Merchant bar prices are firm at 2.35c., c.i.f., but demand is limited to small lots.

Plates.—Bookings of plate material this week were confined to lots of less than 100 tons. The Steel Tank & Pipe Co. was low bidder on 100 tons of 24-in. welded steel pipe for the East Bay Municipal Utility District, Oakland. Bids were opened on 370 tons of 52-in. pipe for the Cedar River pipe line No. 2 at Seattle. While 2.35c., c.i.f., is the general quotation, this price has been shaded, at least in one instance, by \$4 a ton, and desirable tonnages can be placed at 2.25c.

Shapes.—Structural steel shape bookings exceeded 2100 tons and included 800 tons for a power house for the Pacific Gas & Electric Co., San Francisco, placed with the Judson-Pacific Co.; 525 tons for a soundproof

stage for the RKO studios, Los Angeles, booked by the Consolidated Steel Corporation, and 300 tons for a mill for the Hines Lumber Co., Burns, Ore., secured by the Minneapolis Steel & Machinery Co. Lindstrom & Feigenson, Portland, got the general contract for the 2400-ton Eleventh Street viaduct at Tacoma, but have not yet awarded the sub-contract for the structural steel. Other pending business includes 830 tons for an office building in Phoenix and 600 tons for the Bremerton bridge, Seattle. Prices on domestic material continue firm at 2.35c., c.i.f.

Cast Iron Pipe.—Awards and new inquiries were not of heavy proportions this week. The National Cast Iron Pipe Co. took 297 tons of 10-in. Class B pipe for El Segundo, Cal., and the American Cast Iron Pipe Co. booked 200 tons of 6 and 8-in. Class 150 pipe for Burbank, Cal. Santa Ana, Cal., placed 449 tons of 2 to 8-in. Class B pipe with the Western Construction Co. The University of California, Berkeley, has abandoned the project at Redwood City on which it recently requested bids for 287 tons of 4 to 10-in. Class 150 pipe. The Los Angeles County Water Works District No. 16 will open bids Nov. 25 on 477 tons of 4 to 10-in. Class B pipe. San Diego, Cal., will open bids Nov. 14 on 293 tons for the improvement of La Mesa Colony and on Nov. 25 on 230 tons of 4 and 6-in. Class C pipe for Coronado Avenue.

Steel Pipe.—The Standard Oil Co. has an inquiry out for 44 miles of 18-in., 46 miles of 20-in., 82 miles of 22-in., 100 miles of 24-in. and 72 miles of 26-in. gas line pipe. Bids are being asked on several weights of pipe totaling approximately 100,000 tons. Foreign interests have been asked to quote on the pipe, but English and Continental mills are not able to make deliveries in the time specified.

Boston

Export Demand for Scrap Grows as Call From Domestic Mills Declines—Pig Iron Dull

BOSTON, Nov. 12.—Current demand for pig iron is largely for car lots and for mixture purposes. The Mystic Iron Works reported the past week sales as 3000 tons, but other sellers did much less. While Buffalo district furnaces openly quote \$18 a ton, furnace, for No. 2 plain and No. 2X, concessions of 50c. a ton are sometimes given. Foundries intimate they will buy first quarter iron next month, but there is no certainty on that point as many are covered into January.

Foundry iron prices per gross ton deliv'd to most New England points:
 †Buffalo, sil. 1.75 to 2.25...\$21.55 to \$22.05
 †Buffalo, sil. 2.25 to 2.75... 22.05 to 22.55
 *Buffalo, sil. 1.75 to 2.25... 22.41 to 22.91
 *Buffalo, sil. 2.25 to 2.75... 22.91 to 23.41
 East Penn., sil. 1.75 to 2.25... 22.65 to 23.15
 East Penn., sil. 2.25 to 2.75... 23.15 to 23.65
 Va., sil. 1.75 to 2.25... 25.21 to 25.71
 Va., sil. 2.25 to 2.75... 25.71 to 26.21
 *Ala., sil. 1.75 to 2.25... 24.11 to 24.61
 *Ala., sil. 2.25 to 2.75... 24.61 to 25.11
 †Ala., sil. 1.75 to 2.25... 20.25 to 20.75
 †Ala., sil. 2.25 to 2.75... 20.75 to 21.25

Freight rates: \$4.91 all rail from Buffalo, and \$4.05 rail and water; \$3.65 all rail from eastern Pennsylvania; \$5.21 all rail from Virginia; \$9.61 all rail from Alabama and \$5.75 rail and water from Alabama to New England seaboard.

*All rail rate.

†Rail and water rate.

Reinforcing Steel.—Billet steel bar business is confined mostly to small lots, and the past week's aggregate was below average. Numerous prospects for round tonnages have either been abandoned or have shrunk to small proportions. Competition for

business is keen, and quoted prices are often shaded. Prices quoted openly are 2.61½c. a lb., base, from stock on large tonnages and 3.16c. for small lots. The rail steel bar price is 2.26½c. a lb., base, delivered common Boston freight rate points, but concessions can be obtained.

Fabricated Steel.—No large ton-

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars, small shapes	3.265c.
Flat, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway rounds	6.60c.
Norway squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tie steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold-rolled steel—	
Rounds and hex.	*3.55c. to 5.55c.
Squares and flats	*4.05c. to 7.05c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.
Per Cent Off List	
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and struc. shapes	3.30c.
Soft steel bars	3.30c.
Small angles, ½-in. and over	3.15c.
Small angles, under ½-in.	3.55c.
Small channels and tees, ¼-in. to 2 ¾-in.	3.75c.
Spring steel, ¼-in. and thicker	5.00c.
Black sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.80c.
Galv. sheets (No. 24)	5.30c.
Struct. rivets, ½-in. and larger	5.65c.
Com. wire nails, base per keg	\$3.40
Cement c'd nails, 100 lb. keg	3.40

nages were taken by fabricators the past week. Although pending jobs are relatively small, the aggregate is larger than a year ago. Competition among fabricators is still keen and some low prices are being made.

Cast Iron Pipe.—Chelsea, Mass., will close bids Nov. 14 on 100 tons of 6 and 8 in. pipe, and Keene, N. H., early next year will buy 3600 ft. of 12 in. No other open business developed the past week, but a fair tonnage was bought privately. Use of welded pipe by gas companies is materially cutting into New England sales of cast iron pipe. Prices quoted openly on domestic pipe are: 4-in., \$44.10 to \$45.10 a ton, delivered common Boston freight rate points; 6 to 12-in., \$40.10 to \$41.10; 16 to 20-in., \$39.60. A \$4 differential is asked on Class A and gas pipe.

Coke.—Virtually every New England foundry that makes a practice of contracting ahead for its fuel supply has done so for the first half of 1930 on a sliding price scale. According to coke makers, there is no indication that the present delivered price, \$11 a ton, within a \$3.10 freight rate zone, is likely to be changed soon. Current specifications against contracts hold about on a level with those for October.

Old Material.—The scrap market, so far as domestic consumption is concerned, is in the doldrums. Steel mills apparently want little scrap. Dealers' yard stocks are compara-

tively small, while scrap owners are reluctant to sell at prevailing prices. Values continue to seek new low levels, materials usually active being 25c. to 50c. a ton lower than a week ago. Quotations on girder rails, railroad and yard wrought, car axles and shafting are nominal. While domestic demand for scrap is lacking, that for foreign shipment is increasing. The 3000 tons of scrap reported as being loaded here for Danzig will go to Genoa instead. The freight is \$6 a ton. Another boat will shortly load 3000 tons of rails and miscellaneous scrap for Danzig, with a \$5.25 a ton freight rate. Negotiations are going on for other foreign shipments, aggregating about 10,000 tons.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	\$10.00 to \$10.25
Scrap T rails	10.00 to 10.25
Scrap girder rails	9.00 to 9.50
No. 1 railroad wrought	10.00 to 10.50
No. 1 yard wrought	9.50 to 10.00
Machine shop turnings	6.00 to 6.50
Cast iron borings (steel works and rolling mill)	6.00 to 6.50
Bundled skeleton, long	8.75 to 9.00
Forge flashings	9.00 to 9.50
Blast furnace borings and turnings	6.00 to 6.25
Forge scrap	8.50 to 9.00
Shafting	14.00 to 14.25
Steel car axles	17.00 to 17.50
Wrought pipe 1 in. in diameter (over 2 ft. long)	9.00 to 9.50
Rails for rolling	11.50 to 12.00
Cast iron borings, chemical	9.50 to 9.75

Prices per gross ton deliv'd consumers' yards:

Textile cast	\$14.00 to \$14.50
No. 1 machinery cast	15.00 to 15.25
No. 2 machinery cast	13.00 to 13.25
Stove plate	11.00 to 11.50
Railroad malleable	18.50 to 19.00

position in order to reduce inventories. Consequently Youngstown and nearby companies feel that they can count on a fairly good demand from this source over the remainder of the year.

Prices are fairly satisfactory for a period of such light demand. Although sheet quotations are \$2 or more below those of the second quarter, they seem to be holding better at present levels than at any time during the last three months. Black sheets may be considered firm at 2.75c., Pittsburgh, and galvanized material is still generally quoted at 3.50c. However, jobbers are able to purchase material at \$2 under this figure. Blue annealed sheets and light plates are still quoted at 2.35c. and 2.20c., Pittsburgh, respectively, and on the small tonnages, which constitute the bulk of business being placed at this time, these figures are holding fairly well. Wide strip competition occasionally develops sharp concessions, but sellers of the jobbing mill product are not inclined to meet such prices. Automobile body sheets are holding at 4c., Pittsburgh, and metal furniture at 4.10c. Reports that the auto body sheet price is meeting with considerable pressure in the Michigan territory are scouted in this district, as sellers say that no tonnages are coming out which could be considered attractive enough to invite price shading. Bars and plates are holding at 1.90c., Pittsburgh, and wire and wire nail prices are not as weak as they have been.

Pig iron demand is very light. Shipments have declined and curtailment in operations is expected to follow. The Youngstown Sheet & Tube Co. soon expects to blow out one of its Hubbard, Ohio, furnaces, which is generally considered a merchant stack, and another Valley producer may soon take similar action. The Carnegie Steel Co. has recently reduced its furnace operations rather sharply in the Valleys, and is now operating only three of its six stacks at Youngstown, one of three at New Castle and one of three at Farrell. The Republic Iron & Steel Co. is operating all four of its Haselton furnaces, while the Sheet & Tube company has four on at the Campbell works, and one at Brier Hill.

The scrap market is weak, and dealers would sell No. 1 heavy melting steel at \$17. Hydraulic compressed sheets might bring almost as much, as the supply is limited, but there is little on which to base quotations in the absence of mill buying.

General Refractories Co., Philadelphia, has appointed as high-temperature cement representative in the Pittsburgh district the Harris Pump & Supply Co., 321 First Avenue, Pittsburgh. The territory will cover the western half of Pennsylvania, northern part of West Virginia, the eastern edge of Ohio and the extreme western end of Maryland. The commodities to be handled are Grefco, chrome high-temperature cement and standard silica bonding cement.

Youngstown

Valley Open-Hearth Operations Down to 60 Per Cent But Finishing Mills Are Doing Slightly More

YOUNGSTOWN, Nov. 12.—Steel operations in the Valleys are considerably lower than they have been this year, but further curtailment, at least in the rate of open-hearth operations, now seems unlikely. Only a few more than half of the total available open-hearth furnaces in the district are operating, although production is not less than 60 per cent of capacity. Finishing mills are running at a slightly higher rate, as the output of raw steel was not reduced as rapidly as rolling mill operations during October, and at this time steel companies are anxious to reduce their stocks of steel to the absolute minimum.

Last week pipe mills were running at a slightly better rate than sheet and strip units, a rather unusual occurrence in this district. Bar mill operations were also low, averaging between 50 and 60 per cent. However, the rate for bar mills is no longer fixed at the beginning of the week, and a plant which began the week at 50 per cent might end up at close to 70. The same thing is true with strip mills, although some strip units, as well as sheet mills, are being closed down occasionally for an entire week. In this manner a more

economic operation is assured for the active weeks. Makers of automobile body and other special sheets are particularly hard hit, although the output of metal furniture sheets is still comparatively high.

Valley sheet mills are receiving slightly improved specifications from the Chevrolet Motor Co. for shipment during the last week of the month, but more conservative opinion does not interpret this as an indication of greater activity in the automobile industry during the remainder of this year. Further curtailment in the requirements of the Ford Motor Co. is expected, and other large users of steel in Michigan are tending to curtail rather than step up their production schedules during this month and December. The automobile industry has been the first to suffer definite adverse effects from the recent sharp decline in stock prices, but there is yet nothing to indicate that this will seriously interfere with production during the first half of 1930. Large users of steel in the immediate Youngstown district have also curtailed production slightly, but these companies are admirably located to maintain low stocks of steel, and have always taken advantage of their

Cincinnati

Pig Iron Sales, at 3900 Tons, Largest in Four Weeks— Sheet Demand Declines

CINCINNATI, Nov. 12.—Although the district pig iron market is quiet and buyers are adhering to a conservative purchasing policy, the total sales last week were approximately 3900 tons, the largest amount sold in this district for about four weeks. Despite this apparent good tonnage, the break in stock market prices and the slackening of automotive production are having a depressing effect on the local market. Among the orders last week was one from a southern Ohio consumer for 200 tons of Southern foundry iron. This is the first fair-sized order since the return of Southern furnaces to formal price schedules, and the furnace representative indicates that this tonnage was taken at \$14.50, base Birmingham. Southern furnaces are said to be adhering to this quotation. There is talk among furnace representatives here of a movement to increase the Southern price schedules. Other sizable orders were 300 tons of Northern iron from a Chattanooga, Tenn., buyer; 600 tons of Northern foundry from a Zanesville, Ohio, consumer and 250 tons of the same grade from a Kokomo, Ind., buyer. The rest of the week's business was in small quantities. Except for an inquiry from a Hamilton, Ohio, consumer for 1250 tons of Northern foundry iron, there is no pending business.

Prices per gross ton, deliv'd Cincinnati:
So. Ohio fdy., sil. 1.75 to 2.25 \$19.89 to \$20.39
Ala. fdy., sil. 1.75 to 2.25... 17.69 to 18.19
Ala. fdy., sil. 2.25 to 2.75... 18.19 to 18.69
Tenn. fdy., sil. 1.75 to 2.25... 17.69 to 18.19
S'th'n Ohio silvery, 8 per cent 26.89

Freight rates, \$1.89 from Ironton and Jackson, Ohio; \$3.69 from Birmingham.

Finished Material.—The recent stock market break has brought an attitude of caution among district consumers of sheets. District mills report that specifications are lighter than a week or two ago. A leading interest in this district indicates that bookings last week were only slightly more than 50 per cent of capacity. Not only is this true of the automotive demand, but

the general sheet demand also shows easing. Although a number of large construction projects are under way or contemplated, no movement has been made to cover for fabricated materials. The district fabricated steel market is dull.

Coke.—The movement of coke on contract has slackened noticeably this month. By-product oven representatives report that during the last week automotive foundries refused most of their shipments and, while other foundries took some coke, their specifications were not so large as usual. Beehive oven representatives, on the other hand, report that shipments are going forward at a fair rate. New business is virtually negligible.

Old Material.—Although mills in the South are taking scrap on contract and even in some instances making

new purchases, local mills and those in the Valley are curtailing both shipments and purchases. The local old material market is feeling the pinch of the lessened demand and dealers are bidding 25 to 50c. less on the leading grades of scrap than they were a week ago. Dealers are exercising caution in their purchases. The Louisville & Nashville Railroad is offering a list of 7500 tons, of which 1600 tons is rails. The Southern Railway and the Chesapeake & Ohio are offering their usual lists.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel.....	\$12.75 to \$13.25
Scrap rails for melting...	14.00 to 14.25
Loose sheet clippings.....	8.50 to 9.00
Bundled sheets	10.75 to 11.25
Cast iron borings.....	8.50 to 9.00
Machine shop turnings....	8.00 to 8.50
No. 1 busheling.....	10.25 to 10.75
No. 2 busheling.....	7.00 to 7.50
Rails for rolling.....	14.25 to 14.75
No. 1 locomotive tires....	14.25 to 14.75
No. 2 railroad wrought....	12.75 to 13.25
Short rails	18.00 to 18.50
Cast iron carwheels.....	12.50 to 13.00
No. 1 machinery cast.....	18.50 to 19.00
No. 1 railroad cast.....	15.00 to 15.50
Burnt cast	10.00 to 10.50
Stove plate	10.00 to 10.50
Brake shoes	10.00 to 10.50
Agricultural malleable....	14.00 to 14.50
Railroad malleable	15.00 to 15.50

Birmingham

Pig Iron Shipments Large but New Business Is Light— Steel Orders Decline Slightly

BIRMINGHAM, Nov. 12.—A good movement of iron on contract is the chief activity in the pig iron market. A continuation of this active rate of shipments is expected for the remainder of November, at least. There has been only a small amount of forward coverage in the past few weeks. Inquiry for first quarter iron that began to develop in late October has subsided, and buyers appear satisfied to await developments. It is now predicted that the present quietness will delay the opening of books for the first quarter longer than had been expected. Prices show no change, the base being \$14.50 for district sales. The number of active furnaces remains at 15.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:
No. 2 fdy., 1.75 to 2.25 sil..... \$14.50
No. 1 fdy., 2.25 to 2.75 sil..... 15.00
Basic

Buffalo

Pig Iron Shipments Hold Up but New Business Is Slack —Steel Mill Operations Reduced

BUFFALO, Nov. 12.—Shipments of pig iron are holding up well, but new business is slack. Current buying is in small lots for prompt shipment. The price of \$19.50, base, is firm in the district, but the Eastern price of \$18 is being shaded to \$17.50. Barge canal shipments of pig iron will cease between Nov. 15 and 20. The "X" furnace of the Wickwire-Spencer Steel Corporation will go out within a short time and will be replaced by a "Y" furnace, which will resume operation on foundry iron.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25.....	\$19.50
No. 2X fdy., sil. 2.25 to 2.75.....	20.00
No. 1 fdy., sil. 2.75 to 3.25.....	21.00
Malleable, sil. up to 2.25.....	20.00
Basic	\$17.50 to 18.00
Lake Superior charcoal.....	27.28

Finished Steel.—Mill operation is slightly lower than a week ago. The Lackawanna plant of the Bethlehem Steel Co. is now operating 18 open-hearths, the lowest number in some time; the Donner Steel Co. is operating four open-hearths, and the Wickwire-Spencer Steel Corporation is operating three out of its four. The Seneca Iron & Steel Co. is operating at 65 to 70 per cent. The structural steel market is quiet, with one inquiry out from Albany for 800 tons. The small structural tonnage has dropped off, though most fabricators report business booked sufficient to run shops for two months.

Old Material.—The latest purchase of No. 1 heavy melting steel was made about a week ago at \$15. The tonnage is understood to have been comparatively small, but a considerable amount of No. 2 heavy melting steel was taken by the same consumer at \$13.50. There has been a small sale of rolled steel wheels and railroad knuckles and couplers at about \$18. Cast iron borings have become scarce. Production of turnings and borings is off, and there is a fair demand for turnings. General production of scrap has dropped off almost as much as shipments. One large mill here con-

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and struc. shapes.....	3.40c.
Soft steel bars.....	3.30c.
Reinforcing bars.....	2.95c.
Cold-fin. flats, sq. and hex.....	4.45c.
Rounds.....	3.95c.
Cold-rolled strip steel.....	5.85c.
Black sheets (No. 24).....	4.20c.
Galv. sheets (No. 24).....	4.85c.
Blue ann'd sheets (No. 10).....	3.50c.
Com. wire nails, base per keg.....	\$3.60
Black wire, base per 100 lb.....	3.75

tinues to hold up shipments, although some relief is in prospect for the dealers. The market is no weaker. One mill in this territory has received so far this year 200,000 tons of railroad and structural scrap, hydraulic compressed and drop forge flashings by boat shipment from West.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel.....	\$15.00 to \$16.00
No. 2 heavy melting steel.....	13.50 to 14.50
Scrap rails.....	15.00 to 15.50
Hydraul. comp. sheets.....	13.50 to 14.50
Hand bundled sheets.....	11.00 to 11.50
Drop forge flashings.....	13.75 to 14.00
No. 1 busheling.....	13.50 to 14.50
Hvy. steel axle turnings.....	13.50 to 14.00
Machine shop turnings.....	7.50 to 8.00
No. 1 railroad wrought.....	13.00 to 13.50
Acid Open-Hearth Grades:	
Knuckles and couplers.....	17.00 to 17.50
Coil and leaf springs.....	17.00 to 17.50
Rolled steel wheels.....	17.00 to 17.50
Low phos. billet and bloom ends.....	18.00 to 18.50
Electric Furnace Grades:	
Short shov. steel turnings.....	11.25 to 11.75
Blast Furnace Grades:	
Short mixed borings and turnings.....	11.25 to 11.75
Cast iron borings.....	11.25 to 11.75
No. 2 busheling.....	9.50 to 10.00
Rolling Mill Grades:	
Steel car axles.....	17.00 to 17.50
Iron axles.....	20.00 to 21.00
Cupola Grades:	
No. 1 machinery cast.....	15.00 to 15.50
Stove plate.....	12.50 to 12.75
Locomotive grate bars.....	11.00 to 11.50
Steel rails, 3 ft. and under.....	18.75 to 19.00
Cast iron carwheels.....	13.00 to 13.50
Malleable Grades:	
Industrial.....	17.50 to 18.00
Railroad.....	17.50 to 18.00
Agricultural.....	17.50 to 18.00
Special Grades:	
Chemical borings.....	12.50 to 13.50

under the price quoted by United States furnaces for delivery in this market, with the result that there is little merchant iron coming into Canada other than that for use in the agricultural implement industry. Canadian iron prices are firm.

Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75.....	\$23.60
No. 2 fdy., sil. 1.75 to 2.25.....	23.10
Malleable	23.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75.....	\$25.00
No. 2 fdy., sil. 1.75 to 2.25.....	24.50
Malleable	25.00
Basic	23.50
Imported Iron, Montreal Warehouse	
Summerlee	\$33.50
Carron	33.00

Structural Steel.—With winter weather only a short way off, building activities in Canada are gradually declining, and a slowing down in structural steel demand has resulted. Only small tonnages were awarded during the week. Fabricators, however, are well supplied with orders and are assured of capacity operations well into the new year. Deliveries against contract are going forward on schedule.

Old Material.—Little or no interest developed in the Canadian markets during the week. Buying by both Ontario and Quebec consumers appears to be held to a minimum, with the result that only small tonnages were closed. Consumption, however, is well sustained. Prices are unchanged.

Dealers' buying prices:

Per Gross Ton		
	Toronto	Montreal
Heavy melting steel.....	\$10.00	\$8.50
Rails, scrap.....	11.00	9.00
No. 1 wrought.....	10.00	12.00
Machine shop turnings.....	7.50	5.00
Boiler plate.....	7.50	6.00
Heavy axle turnings.....	8.00	7.50
Cast borings.....	7.50	5.00
Steel borings.....	7.50	6.50
Wrought pipe.....	6.00	6.00
Steel axles.....	15.00	20.00
Axles, wrought iron.....	17.00	22.00
No. 1 machinery cast.....	.....	17.00
Stove plate.....	.....	13.00
Standard carwheels.....	.....	16.00
Malleable.....	.....	13.00
Per Net Ton		
No. 1 mach'y cast.....	\$16.00	.....
Stove plate.....	12.00	.....
Standard carwheels.....	15.00	.....
Malleable scrap.....	14.00	.....

Change Reinforcing Steel Trade Practice

WASHINGTON, Nov. 11.—The Federal Trade Commission has reconsidered and modified Rule 8, adopted by the reinforcing steel fabricating and distributing industry in its recent trade practice conference. The rule, which came under Group II, was changed to read as follows:

The industry approves the practice of each individual member of the industry independently publishing and circulating to the purchasing trade his own price lists.

The rule formerly provided for circulating an individual member's current price lists and also notices of advances, declines or other changes in prices. Group II rules are those which are accepted by the commission as expressions of the trade, and which may or may not concern practices in violation of the law.

Canada

Pig Iron Demand Eases; Structural Steel Quieter

TORONTO, ONT., Nov. 12.—The demand for merchant pig iron in the Canadian markets continues to ease off. Spot buying in small tonnages is responsible for practically the entire business done during the week, with sales totaling about 1500 tons. No forward delivery orders were taken, but producers are heavily booked to the end of the year and are making regular and large tonnage shipments against contract. The daily melt has been slightly reduced as a result of

curtailed operations among some of the automotive plants, but, taken as a whole, mills, foundries, radiator plants, etc., are running only slightly under the capacity mark. Backlogs are sufficient to maintain the present rate of operations for some time to come. It is reported that agricultural implement plants are now running under 50 per cent capacity. While the slowing down in this industry has some reaction on the Canadian iron and steel industry, its chief effect is on the importation of pig iron and other raw materials. Pig iron imports have been materially reduced during the past month or six weeks. The recent reduction in Canadian iron prices has brought the local quotations

St. Louis

Pig Iron Sales, 23,000 Tons, Include 10,000 Tons of Basic —Two Roads Buy 31,000 Tons of Rails

ST. LOUIS, Nov. 12.—The principal transaction in a week which showed a marked improvement over the preceding period was the sale of 10,000 tons of basic pig iron by the St. Louis Gas & Coke Corporation to an East Side melter for shipment during the remainder of 1929 and the first quarter of next year. The local maker, whose total sales for the week exceeded 23,000 tons, also sold 2000 tons of foundry iron to an Illinois implement manufacturer for shipment during the remainder of the year, 500 tons to an Illinois car builder for prompt shipment, and 200 tons and 300 tons respectively to jobbing foundries in St. Louis for first quarter shipment, the remainder being for prompt delivery. The melt in the St. Louis district is reported to be holding up well. Foundries catering to the automobile trade show a decrease in business, while the stove plants are exceedingly busy.

Prices per gross ton at St. Louis:

No. 2 fdy., sil.	1.75 to 2.25
f.o.b. Granite City, Ill.	\$19.50 to \$20.00
Malleable, f.o.b. Granite City	20.00
N'th'n No. 2 fdy., deliv'd St. Louis	22.16
Southern No. 2 fdy., deliv'd	16.92 to 18.92
Northern malleable, deliv'd	22.16
Northern basic, deliv'd	22.16

Freight rates: 75c. (average) Granite City to St. Louis; \$2.16 from Chicago; \$4.42 from Birmingham.

Rails.—The Wabash Railway purchased 23,000 tons of 110-lb. rails for January, February and March delivery, allocated as follows: Illinois Steel Co., 11,000 tons; Inland Steel Co., 9000 tons and Bethlehem Steel Co., 3000 tons. The Kansas City Southern Railway has purchased 8000 tons of rails from the Illinois Steel Co., Bethlehem Steel Co. and Inland Steel Co., the exact division not being known here.

Finished Steel.—Warehouse business for October is said to have been about 5 per cent better than that of the same month last year and slightly better than that of September. The increase has been on virtually all

lines except structural. Structural fabricators are looking elsewhere for business, now that there is very little doing in St. Louis. The Mississippi Valley Structural Steel Co. got the order for 3500 tons for the Biltmore Hotel in Oklahoma City, Okla. The Missouri Highway Commission has opened bids for road and bridge work calling for 500 to 700 tons of reinforcing bars and 400 tons of structural steel.

Coke.—By-product ovens in the district report heavy shipments of domestic grades, and one factor reports stocks are lower than at any time in its history. Foundry and furnace coke also are in good demand.

Old Material.—The market for old material continues weak, as a result of the continued lack of buying by mills in the district, although two mills have indicated they will take supplies at their own prices, which dealers say are far too low. Dealers are buying only against contracts. There is some "distressed" material. No. 2 heavy melting steel, miscel-

laneous standard-section rails are 25c. lower, while railroad springs, bundled sheets, No. 2 railroad wrought, steel car axles, short steel rails and railroad malleable are 50c. lower. Railroad lists: Wabash, 3335 tons; Texas & Pacific, 1500 tons; Chicago, Rock Island & Pacific, 200 carloads; Great Northern, 106 carloads; St. Louis-San Francisco, 60 carloads, and Chicago & Eastern Illinois, 25 carloads.

Dealers' buying prices per gross ton, f.o.b. St. Louis district:

No. 1 heavy melting or shoveling steel	\$13.00 to \$13.50
No. 2 heavy melting or shoveling steel	12.25 to 12.75
No. 1 locomotive tires	15.00 to 15.50
Misc. stand.-sec. rails including frogs, switches and guards, cut apart	14.25 to 14.75
Railroad springs	16.00 to 16.50
Bundled sheets	9.50 to 10.00
No. 2 railroad wrought	13.00 to 13.50
No. 1 busheling	9.75 to 10.25
Cast iron borings and shoveling turnings	9.25 to 9.75
Iron rails	13.00 to 13.50
Rails for rolling	15.25 to 15.75
Machine shop turnings	7.25 to 7.75
Heavy turnings	9.50 to 10.00
Steel car axles	18.50 to 19.00
Iron car axles	27.00 to 27.50
Wrot. iron bars and trans.	21.50 to 22.00
No. 1 railroad wrought	13.00 to 13.50
Steel rails, less than 3 ft.	17.00 to 17.50
Steel angle bars	14.00 to 14.50
Cast iron carwheels	14.00 to 14.50
No. 1 machinery cast	15.25 to 15.75
Railroad malleable	14.00 to 14.50
No. 1 railroad cast	14.50 to 15.00
Stove plate	12.00 to 12.25
Agricult. malleable	14.00 to 14.50
Relay. rails 60 lb. and under	20.50 to 23.50
Relay. rails 70 lb. and over	26.50 to 29.00

Canadian Tariff Board Schedules Hearings

WASHINGTON, Nov. 12.—All items bearing upon the iron and steel industry of Canada, together with machinery and other lines, will be covered at hearings to be held at Ottawa by the Canadian Advisory Board on Tariff and Taxation, to begin Nov. 26, according to a telegram received by the Department of Commerce from Commercial Attache Lynn W. Meekins. Instructions to this end have been issued to the board by the Minister of Finance, who also asked that the hearings include a review of the various applications for duty changes on iron and steel products and machinery. The Minister of Finance likewise has requested the board to investigate relative prices of automobiles in Canada and in the United States, as well as the percentage of Canadian material and labor used in each model upon which Canadian manufacturers are now claiming exemption from excise tax. The final date of hearing has been set for Dec. 12, when motor vehicles will be the subject under discussion and when also the board will consider an application by a Canadian company for reduced duties on axles, bolts, shafts, radiators, and other parts for motor trucks.

The schedule of hearings follows:

Nov. 26.—Scrap, pig iron, ferroalloys, ingots, blooms, and billets, bars, and rods.
Nov. 27 and 28.—Sheets, plates, hoop, band, strip, skelp, structural steel, railroad track equipment.

Nov. 29.—Alloy provisions, special steel provisions, castings and forgings.

Dec. 3.—Pipes and tubes, chains, wire springs.

Dec. 4 and 5.—Machinery (agricultural, mining, printing and all other); engine and boilers, not including aeroplane engines.

Dec. 6.—Cutlery, hardware, tools, stamped and coated products, including enameled ware.

Dec. 10 and 11.—Railroad rolling stock, vehicles other than automobiles; stoves, and miscellaneous products.

Dec. 12.—Automobiles and motor trucks, including engines and parts.

Steel Corporation's Orders Gain 183,981 Tons

Another gain in the unfilled orders of the United States Steel Corporation was registered in October—183,981 tons. The gain in September was 244,370 tons. These two gains contrast with losses in the previous four months, the August decline having been 429,966 tons. The total on Oct. 31 was 4,086,562 tons as against 3,751,030 tons on Oct. 31, 1928.

Unfilled tonnage at the end of each month for the past three years follows:

	1929	1928	1927
October	4,086,562	3,751,030	3,341,000
September	3,902,581	3,698,368	3,148,113
August	3,658,211	3,624,043	3,196,037
July	4,088,177	3,570,927	3,142,014
June	4,256,910	3,637,000	3,053,246
May	4,304,167	3,416,822	3,050,941
April	4,427,763	3,872,133	3,456,132
March	4,410,718	4,335,206	3,553,140
February	4,144,341	4,398,189	3,597,119
January	4,109,487	4,275,947	3,800,177
	1928	1927	1926
December	3,976,712	3,972,874	3,960,696
November	3,673,000	3,454,441	3,807,447

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-fin. rounds, shaftings, screw stock	3.75c.
Black sheets (No. 24)	4.25c.
Galv. sheets (No. 24)	5.10c.
Blue ann'd sheets (No. 10)	3.45c.
Black corrug. sheets (No. 24)	4.30c.
Galv. corrug. sheets	5.15c.
Structural rivets	4.15c.
Boiler rivets	4.15c.
	Per Cent Off List
Tank rivets, 5/8-in. and smaller, 100 lb. or more	65
Less than 100 lb.	60
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, sq., blank or tapped, 200 lb. or more	60
Less than 200 lb.	50
Hot-pressed nuts, hex., blank or tapped, 200 lb. or more	60
Less than 200 lb.	50

Non-Ferrous Metal Markets

Lead and Zinc Again Decline —Tin at New Low—Copper Steady

NEW YORK, Nov. 12.

Copper.—Despite the sharp declines in prices of tin, lead and zinc, no marked weakness has yet appeared in copper. Within the week a few lots of so-called distress metal have been offered as low as 17.75c., delivered in the Connecticut Valley, but all producers, both primary and custom smelters, are rigidly adhering to 18c. and do not see any reason for a lower price for some time to come, if at all. Actual buying of copper is extremely light. Domestic consumers are taking only hand-to-mouth lots, although they admit that orders on their books for fabricated material are not all covered by copper contracts. Foreign consumers are also buying sparingly. There is some talk that the situation may reappear which prevailed during the summer when primary producers were entirely out of the market and left such business as there was to custom smelters. Copper exporters continue to hold their quotation to 18.30c., c.i.f. usual European ports, although in the last week electrolytic copper in London has sold at an equivalent of 18.15c. Production is being curtailed at the mines, one company announcing a reduction of 25 per cent in its output, with others reported to be planning reduction. October statistics out today were quite favorable to producers. Refined stocks were reduced 6350 tons, and total stocks about 5000 tons, which means an increase in blister copper stocks of about 1350 tons. Shipments in October were the second best total at 105,729 tons, compared with 105,860 tons in March. Foreign shipments in October were 53,000 tons against 59,000 tons also in March. Lake copper is very quiet and steady at 18.12½c., delivered.

Tin.—Spot Straits tin yesterday at 39c., New York, is the lowest price since Aug. 14, 1923. Lower prices have been the rule since last week, due largely to weakness in London. Sales have been larger, however, at these prices, the total for the week ended Saturday, Nov. 7, having been about 800 tons. Yesterday, 200 tons was sold, but the most active day was Thursday, Nov. 7, when 400 tons changed hands. This single day of activity was due largely to a stronger stock market and a heavy reduction in brokers' loans. In yesterday's

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	Nov. 12	Nov. 11	Nov. 9	Nov. 8	Nov. 7	Nov. 6
Lake copper, New York.....	18.12½	18.12½	18.12½	18.12½	18.12½	18.12½
Electrolytic copper, N. Y.*	17.75	17.75	17.75	17.75	17.75	17.75
Straits tin, spot, N. Y.	39.37½	39.00	...	39.50	39.62½	39.50
Zinc, East St. Louis.....	6.25	6.25	6.25	6.25	6.40	6.50
Zinc, New York.....	6.60	6.60	6.60	6.60	6.75	6.85
Lead, St. Louis.....	6.10	6.10	6.10	6.10	6.10	6.35
Lead, New York.....	6.25	6.25	6.25	6.25	6.25	6.50

*Refinery quotation; price ¼c. higher delivered in the Connecticut Valley.

Rolled Products

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass.....	23.25c.
Copper, hot rolled.....	26.75c.
Zinc.....	10.50c.
Lead (full sheets).....	10.25c.
Seamless Tubes—	
High brass.....	28.25c.
Copper.....	29.25c.
Rods—	
High brass.....	21.25c.
Naval brass.....	24.00c.
Wire—	
Copper.....	19.87½c.
High brass.....	23.75c.
Copper in Rolls.....	26.75c.
Brazed Brass Tubing.....	30.87½c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide.....	33.00c.
Tubes, base.....	42.00c.
Machine rods.....	34.00c.

Chicago Warehouse

(Prices Cover Trucking to Customers' Doors in City Limits)

Sheets—	Base per Lb.
High brass.....	23.25c.
Copper, hot rolled.....	27.75c.
Copper, cold rolled, 14 oz. and heavier.....	30.00c.
Zinc.....	10.75c.
Lead, wide.....	11.35c.
Seamless Tubes—	
Brass.....	28.25c.
Copper.....	29.25c.
Brass Rods.....	21.25c.
Brazed Brass Tubes.....	31.00c.

New York or Cleveland Warehouse

Delivered Prices, Base per Lb.

High brass.....	21.12½c. to 22.12½c.
Copper, hot rolled, base sizes.....	27.75c. to 28.75c.
Copper, cold rolled, 14 oz. and heavier, base sizes.....	30.00c. to 31.00c.
Seamless Tubes—	
Brass.....	26.00c. to 27.00c.
Copper.....	29.12½c. to 30.12½c.
Brass Rods.....	18.87½c. to 19.87½c.
Brazed Brass Tubes.....	29.12½c. to 30.12½c.

New York Warehouse

Delivered Prices, Base per Lb.

Zinc sheets (No. 9), casks.....	10.75c. to 11.25c.
Zinc sheets, open.....	11.50c. to 12.00c.

Metals from New York Warehouse

Delivered Prices, Per Lb.

Tin, Straits pig.....	41.50c. to 42.50c.
Tin, bar.....	43.50c. to 44.50c.
Copper, Lake.....	19.50c.
Copper, electrolytic.....	19.25c.
Copper, casting.....	19.00c.
Zinc, slab.....	7.50c. to 8.00c.
Lead, American pig.....	7.00c. to 7.50c.
Lead, bar.....	9.00c. to 9.50c.
Antimony, Asiatic.....	10.50c. to 11.00c.
Aluminum No. 1 ingots for remelting (guaranteed over 99% pure).....	25.00c. to 26.00c.
Alum. ingots, No. 12 alloy.....	24.00c. to 25.00c.
Babbitt metal, commercial grade.....	25.00c. to 35.00c.
Solder, ½ and ¼.....	28.00c. to 28.50c.

Metals from Cleveland Warehouse

Delivered Prices, Per Lb.

Tin, Straits pig.....	44.25c.
Tin, bar.....	46.25c.
Copper, Lake.....	19.50c.
Copper, electrolytic.....	19.25c.
Copper, casting.....	18.75c.
Zinc, slab.....	8.00c. to 8.25c.
Lead, American pig.....	7.00c. to 7.20c.
Lead, bar.....	9.25c.
Antimony, Asiatic.....	16.00c.
Babbitt metal, medium grade.....	18.00c.
Babbitt metal, high grade.....	48.00c.
Solder, ½ and ¼.....	28.50c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged consumers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible.....	14.75c.	16.00c.
Copper, hvy. and wire.....	14.50c.	15.50c.
Copper, light and bottoms.....	12.50c.	13.50c.
Brass, heavy.....	8.00c.	9.00c.
Brass, light.....	6.75c.	7.75c.
Hvy. machine composition.....	11.75c.	12.75c.
No. 1 yel. brass turnings.....	9.25c.	10.00c.
No. 1 red brass or compos. turnings.....	11.00c.	12.00c.
Lead, heavy.....	5.00c.	5.50c.
Lead, tea.....	4.00c.	4.50c.
Zinc.....	3.25c.	3.75c.
Sheet aluminum.....	13.00c.	14.00c.
Cast aluminum.....	11.25c.	13.25c.

market, prices ranged from 39.25c. down to 38.87½c., for spot and November shipment, both positions selling at the same price. At the close of the day there were more buyers than sellers. Tin closed today at 39.37½c. in a very dull market. Consumers are not buying far ahead, but dealers are more active than for some time. London prices today were £174 15s. for spot standard, £178 for future standard and £178 15s. for spot Straits. The Singapore price today was £180 12s. 6d. A week ago the London prices were about £7 a ton higher.

Lead.—Another reduction by the American Smelting & Refining Co. on Nov. 7, the third in the last 10 days, has brought the New York contract price down from 6.50c. to 6.25c. Here also the decline is largely due to weakness in the London market. Buying is a little more active, but by no means heavy, and is confined to November and December shipment. Some inquiry has appeared for January, but producers are not quoting. At St. Louis, the price is down to 6.10c.

Zinc.—Still further declines in London have forced the quotation of prime Western zinc from 6.50c. to 6.25c., East St. Louis. A little business is reported each day, but buyers continue extremely cautious. Two reductions in the price of ore at Joplin, Mo., have been made in the last two weeks and the quotation now stands at \$40, a decline of \$4 a ton. The corresponding decline in the metal has been about 55 points. Production was fairly large at 13,000

tons for the week ended Saturday, Nov. 7, and the surplus is now estimated at 58,010 tons. Sharp curtailment is reported planned during the present month.

Antimony.—Prospects that the duty on antimony may be higher because of action this week by the Senate has caused some anxiety and prices are a little higher than they were during the week. Chinese metal for spot and early delivery is quoted at 8.62½c., duty paid. Should the Senate's view prevail, the duty would be 4c. instead of at 2c. as at present.

Nickel.—Wholesale lots of ingot nickel are quoted at 35c. per lb. with shot nickel at 36c. and electrolytic nickel in cathodes at 35c.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at the published price of 23.90c. per lb., delivered.

Non-Ferrous Markets at Chicago

CHICAGO, Nov. 12.—Sales in this market are quiet as prices, except for copper, continue to sag. The old metal market is dull and prices are untested.

Prices per lb., in carload lots: Lake copper, 18.50c.; tin, 40.12½c.; lead, 6.20c.; zinc, 6.35c.; in less-than-carload lots, antimony, 9.35c. On old metals we quote copper wire, crucible shapes and copper clips, 14c.; copper bottoms, 11.50c.; red brass, 11.50c.; yellow brass, 8c.; lead pipe, 4.50c.; zinc, 3c.; pewter, No. 1, 24.50c.; tin foil, 24c.; block tin, 34c.; aluminum, 12.87½c.; all being dealers' prices for less-than-carload lots.

which railroads have ordered 9000 cars to be built in their own shops. It is probable that car purchases for the year will run well over 100,000, which would be the largest total since 1924.

Boston & Maine on Tuesday announced the purchase of 1000 steel box cars and 500 steel hopper cars from Standard Steel Car Co., duplicating an order placed with the same car builder a few weeks ago.

Seaboard Air Line is now inquiring for a total of 20 locomotives.

Western Electric Co. is inquiring for 15 flat cars.

National Railways of Mexico have ordered 600 standard gage box cars, 200 gondola cars and 240 sets of trucks from Standard Steel Car Co.

New York, Chicago & St. Louis has ordered 10 steel underframes from Canton Car Co.

Chevrolet Motor Co. has ordered 20 hopper cars from Standard Steel Car Co. Anglo-Mexican Petroleum Co., Ltd., has ordered six tank cars from General American Tank Car Corporation.

Montour Railroad is inquiring for two locomotives.

Georgia, Ashburn, Sylvester & Camilla is inquiring for one locomotive.

Milwaukee Road is considering coming into the market for 5000 cars.

Union Tank Car Co. has ordered 1000 tank cars from American Car & Foundry Co.

Reinforcing Steel

Awards, at 4000 Tons, Show Decline—Inquiries 4300 Tons

THE total of reinforcing steel awards, at slightly more than 4000 tons, was the smallest for any week since Oct. 17. The outstanding contracts were 1500 tons of bars for an industrial building and warehouse in New York and 350 tons for a building in Newark, N. J. New projects totaling about 4300 tons were larger than in the two previous weeks and included 1000 tons in a building for the Pennsylvania Terminal & Warehouse Co., Hoboken, N. J. Awards follow:

NEWBURY, MASS., 180 tons, bridge, to McClintic-Marshall Co.
NEW YORK, 1500 tons, industrial building and warehouse in Varick Street, to McClintic-Marshall Co.
NEWARK, N. J., 200 tons, plant building for National Biscuit Co., to Faltoute Iron & Steel Co.
NEWARK, 135 tons, vaults for National Newark & Essex Bank, to Faltoute Iron & Steel Co.
NEWARK, 350 tons, Monoservice Building, to Igoo Brothers.
SAYREVILLE, N. J., 100 tons, in addition to previous contract, power house, Eastern New Jersey Power & Light Co., to Concrete Steel Co.
CLEVELAND, 250 tons, Film Exchange Building for Warner Brothers Pictures, Inc., to Patterson-Letch Co.
CINCINNATI, 195 tons, building for Hamilton County Tuberculosis Sanitarium, to West Virginia Rail Co.
CHICAGO, 150 tons, building for Norton Co., to Concrete Engineering Co.
CHICAGO, 350 tons, 124th Field Artillery Armory, to Olney J. Dean & Co.
SACRAMENTO, CAL., 100 tons, apartment building, Fourteenth and N Streets, to Truscon Steel Co.
SACRAMENTO, 147 tons, bridge over San Gabriel River, to unnamed bidder.
PORTLAND, ORE., 100 tons, warehouse on East Oak Street, to Mercer Steel Co.
SEATTLE, 363 tons, approach to West Spokane Street bridge, to Pacific Coast Steel Co.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

NEW HAVEN, CONN., 500 tons, sewage disposal plant.
NEW YORK, 200 tons, battery tower, West Washington Street.
HOBOKEN, N. J., 1000 tons, additional unit, Pennsylvania Terminal & Warehouse Co.
BROOKLYN, 200 tons, bridge for Brooklyn-Manhattan Transit Co.
PROVIDENCE, R. I., 150 tons, Crawford Street bridge.
MAYWOOD, ILL., 150 tons, high school.
SPRINGFIELD, ILL., tonnage being estimated, Centennial building.
WAUKEGAN, ILL., 230 tons, power house.
AURORA, ILL., 127 tons, building for Illinois Bell Telephone Co.; Goertz Construction Co., general contractor.
JEFFERSON CITY, MO., 500 to 700 tons, bridge and road work for Missouri Highway Commission.
TACOMA, WASH., 800 tons, Eleventh Street viaduct; general contract to Lindstrom & Feigenson, Portland, Ore., reinforcing steel subcontract not yet placed.
TACOMA, 325 tons, power house No. 2, Lake Cushman dam project; bids opened.

Railroad Equipment

Boston & Maine Orders 1500 Additional Cars

THE outstanding railroad equipment order of the week was placed by the Boston & Maine, calling for 1000 steel box cars and 500 steel hopper cars, which is a duplicate of an order placed by this road a few weeks ago. Both orders went to the Standard Steel Car Co. The Union Tank Car Co. has ordered 1000 tank cars.

Prospects for continued buying of cars is regarded by the car building trade as exceedingly bright. About 15,000 cars are pending, and action on these is expected before the end of the year. The Rock Island inquiry for 5000 and that of the St. Louis-San Francisco for 3800 may be decided within a week or two. Inquiries are also pending for more than 200 locomotives.

Inquiries that are expected before the end of the year make a total of about 20,000 cars. One large road is said to have planned a car-building program for the next three years that will call for the purchase of 10,000 steel box cars a year.

Car orders thus far in 1929 total about 85,000 units, in addition to

Fabricated Structural Steel

Awards of 26,000 Tons Exceed Previous Week But New Business Is Smallest Since June

AWARDS of the past week, totaling close to 26,000 tons, were slightly larger than in the previous week, but below the average for the year. Outstanding contracts were 5000 tons for an apartment building in New York, 3000 tons for a hotel in Oklahoma City, Okla., and 1800 tons for State buildings at Springfield, Ill.

The tonnage of new projects reported was the smallest since June 20, totaling about 19,000 tons. The largest project calls for 3500 tons for a power plant at Waukegan, Ill., and 2500 tons is required for a bank building in Philadelphia. Awards follow:

BOSTON, 370 tons, draw span Congress Street bridge, to Boston Bridge Works, Inc.

BOSTON, 200 tons, banking house addition, to Palmer Steel Co.

CAMBRIDGE, MASS., 200 tons, Vanderbilt Hall, Harvard College, to New England Structural Co.

NEW YORK, 2500 tons, apartment building at 895 Park Avenue, to Levering & Garrigues Co.

NEW YORK, 1800 tons, apartment building at Seventy-eighth Street and Third Avenue, to Harris Structural Steel Co.

NEW YORK, 650 tons, apartment building on East Twenty-first Street, to Paterson Bridge Co.

BROOKLYN, 800 tons, Nurses' Home for Methodist Hospital, to George A. Just Co.

NEW YORK, 5000 tons, San Remo Towers apartment building, Seventy-fourth Street and Central Park West, to Harris Structural Steel Co.

NEW YORK CENTRAL RAILROAD, 400 tons, to American Bridge Co.

SPRINGFIELD, ILL., 1800 tons, State buildings, to Mississippi Valley Structural Steel Co.

BALTIMORE & OHIO RAILROAD, 150 tons, to McClintic-Marshall Co.

KALAMAZOO, MICH., 550 tons, building for Checker Cab Co., to Indiana Bridge Co.

CLEVELAND, 300 tons, East Seventy-ninth Street bridge for Nickel Plate Railroad, to American Bridge Co.

AKRON, OHIO, 700 tons, building for Akron Times-Press, to American Bridge Co.

TOLEDO, OHIO, 500 tons, addition for Electric Auto-Lite Co., to Whitehead & Kales Co.

KOKOMO, IND., 410 tons, telephone exchange, to Insley Mfg. Co.

FORT WAYNE, IND., 400 tons, Public Theater, to McClintic-Marshall Co.

STURGEON BAY, WIS., 1000 tons, highway bridge, to Wausau Iron Works.

CHICAGO, 150 tons, Frederick H. Hild Library, to Wendnagel & Co.

CHEYENNE, WYO., 1200 tons, highway bridge across Canadian River, to Lakeside Bridge & Steel Co., Milwaukee.

SAND SPRINGS, OKLA., 900 tons, highway bridge across Arkansas River, to Clinton Bridge Co.

OKLAHOMA CITY, 3000 tons, Biltmore Hotel; 2500 tons to Mississippi Valley Structural Steel Co. and 500 tons to Kansas City Structural Steel Co.

SAN FRANCISCO, 140 tons, hotel, Turk and Polk Streets, to Judson-Pacific Co.

SAN FRANCISCO, 800 tons, power house for Pacific Gas & Electric Co., to Judson-Pacific Co.

OAKLAND, CAL., 110 tons, addition to Pier No. 2, Oakland Port Commission, to Pacific Coast Engineering Co.

LOS ANGELES, 525 tons, sound stage for R. K. O. Studios, to Consolidated Steel Corporation.

BURNS, ORE., 300 tons, mill for Hines Lumber Co., to Minneapolis Steel & Machinery Co.

SEATTLE, 243 tons, approach to West Spokane Street bridge, to Pacific Car & Foundry Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

PHILADELPHIA, 2500 tons, Market Street Bank, Juniper & Market Streets; William Steel & Sons, general contractors.

PHILADELPHIA, 7000 tons, convention hall; McCloskey & Co., Philadelphia, low bidders on general contract.

STATE OF VERMONT, 900 tons, New England Power Co. units.

BOSTON & MAINE RAILROAD, 350 tons, signal bridges.

FAIRFIELD, CONN., 200 tons, State bridge. WATERTOWN, MASS., 175 tons, Hood Rubber Co. vulcanizing plant.

BOSTON, 180 tons, Lafayette Theater.

PROVIDENCE, R. I., 160 tons, United States Rubber Co. vulcanizing plant.

BOSTON & ALBANY RAILROAD, 150 tons, power house in Allston district.

NEW YORK, 2000 tons, apartment building at Eighty-ninth Street and Park Avenue.

NEW YORK, 1500 tons, Union League Club building, Park Avenue.

PHILADELPHIA, 500 tons, Jewelers' Building; up again for bids.

BALTIMORE & OHIO RAILROAD, 500 tons, bridges.

ALBANY, N. Y., 800 tons, county jail; bids Nov. 25.

CLEVELAND, 110 tons, Dudley H. Blossom swimming pool.

WAUKEGAN, ILL., 3500 tons, power house for Public Service Co. of Northern Illinois; bids to be asked soon.

PROVISO, ILL., 535 tons, township high school; Union Foundry Co., Chicago, low bidder.

JEFFERSON CITY, MO., 400 tons, bridge and road work for Missouri Highway Commission.

WICHITA, KAN., 800 tons, highway bridge.

SUBIACO, ARK., 600 tons, church.

PHOENIX, ARIZ., 830 tons, office building on First Avenue; bids being taken.

RIVERSIDE, CAL., 1250 tons, highway bridge.

SACRAMENTO, CAL., 168 tons, bridge over Corte Madera Creek; bids Nov. 27.

OAKLAND, CAL., 100 tons plates, 24-in. welded steel pipe line, East Bay Municipal Utility District; Steel Tank & Pipe Co., low bidder.

SEATTLE, 600 tons, Bremerton, bridge; bids being taken.

SEATTLE, 370 tons, Dumas Bay bridge; bids Nov. 12.

TACOMA, WASH., 2400 tons, Eleventh Street viaduct; general contract to Lindstrom & Feigeson, Portland, subcontract for steel not yet placed.

Sees Curtailed Demand for Machine Tools

Commenting on the probable effect of the stock market crash on machine tool business, Ernest F. DuBrul, general manager, National Machine Tool Builders' Association, writing in that body's monthly review, says:

On the whole, the near term prospect is not particularly bright. We should always remember that we feel the effects of business movements much more violently both on the upswing and the downswing than the consumer goods industries. That is one of the risks of the machine tool business which must be assumed by anyone who has the ambition to engage in this industry. . . . With the falling off of demand will come some laying off of workmen, and that restricts further demand.

It would seem to be prudent for the machine tool builder to beware of increasing inventory. Inventory that is now on hand, whatever its extent, has been accumulated to fill unfilled orders that have been on the books for some months. But some cancellations have already developed from the over-enthusiastic aircraft industry and perhaps such cancellations might develop in other industries, due to lack of business confidence.

Philadelphia Steel Club Elects Officers

At a luncheon meeting on Nov. 12, the Steel Club of Philadelphia elected its officers for the coming year. Paul M. King, Worth Steel Co., who was vice-president, is the new president, succeeding Willard S. Haring, Alan Wood Steel Co. W. W. Deal, American Steel & Wire Co., was elected vice-president, and S. H. Baker, Sharon Steel Hoop Co., was reelected secretary. John E. Wetzel, Superior Steel Corporation, and Robert J. McCracken, Central Iron & Steel Co., were elected directors.

Higher Freight Rates from South Suspended

WASHINGTON, Nov. 12.—The Interstate Commerce Commission today announced suspension until June 12 of tariff schedules proposing to cancel existing commodity rates on iron and steel products in carloads from points in Alabama, Georgia, Tennessee and Mississippi to points in Trunk Line and New England territories and the substitution of eighth class rates.

Under the proposed schedules, the rate from Birmingham to New York would be increased from 49c. to 65c. per 100 lb. and the rate from Birmingham to Boston would be increased from 51c. to 69c. The suspended schedules will be the subject of a hearing to be held in Birmingham on Dec. 16 before Examiner McChord.

PERSONAL

FREDERICK M. BECKET, president, Union Carbide & Carbon Research Laboratories, was among the distinguished alumni receiving the honorary degree of Doctor of Science at the 175th anniversary of Columbia University. WILLIAM CAMPBELL, Howe Professor of Metallurgy at Columbia University, also was awarded the honorary degree of Doctor of Science.

WILLIAM HUTTON BLAUVELT, consulting engineer, New York, has been appointed manager of gas engineering of the Columbia Engineering & Management Corporation, a subsidiary of Columbia Gas & Electric Corporation, New York. CHARLES R. BELLAMY, who has been associated with Mr. Blauvelt in consulting practice, has joined the Columbia organization as gas engineer.

R. L. COLLIER has been made assistant to GRANVILLE P. ROGERS, managing director of the Steel Founders' Society of America. Mr. Collier is a graduate of Ohio State University. For some time he conducted special work for a public utility company at Cleveland, and for the past three years has been engaged in trade organization work in the electrical field. He will be located in the executive offices of the society, 932 Graybar Building, New York, these offices having been moved from Pittsburgh.

GLENN MUFFLY, engineer in charge of aircraft engine production for the Union Switch & Signal Co., Swissvale, Pa., during the war, has been added to the executive staff of American Cirrus Engines, Inc., Marysville, Mich., a unit of Allied Motor Industries, Inc.

JAMES BRYDEN, works manager of Smith & McLean, Ltd., sheet and bar makers and galvanizers, Glasgow, Scotland, sailed for England on the Mauretania, Nov. 6, after a stay of several weeks in this country.

J. P. GILL, metallurgist for the Vanadium-Alloys Steel Co., Latrobe, Pa., addressed the Hartford chapter of the American Society for Steel Treating on "Alloys and Their Effects in Tool Steels" in the Hartford Electric Co. assembly hall, Nov. 12.

JOSEPH P. FLETCHER, heretofore manager of the Buffalo office of the Independent Pneumatic Tool Co., Chicago, has been appointed manager of the Philadelphia office, succeeding A. L. Schuhl, deceased. W. O. BECKER, who has been in the Toronto office, has been named manager in Buffalo.

GORDON THORNTON has been added to the Cleveland staff of the United States Electrical Tool Co., Cincinnati.

E. D. COWLIN, formerly New York manager of the Reliance Mfg. Co., manufacturer of spring washers and cold-drawn alloy steel, Massillon, Ohio, has been made general sales manager of the company and will make his headquarters at Massillon about Jan. 1.

ARTHUR C. ALLSHUL, formerly manager of the Buffalo plant of Joseph T. Ryerson & Son, Inc., has been appointed manager of its new unit in



A. C. ALLSHUL

the Philadelphia district. As previously announced, the Ryerson company has purchased the business, equipment and good will of the Penn-Jersey Steel Co., Camden, N. J. CLARENCE S. GEDNEY has been appointed manager of the Buffalo plant, succeeding Mr. Allshul. Mr. Gedney has been connected for many years with the specialty sales division of the Ryerson business in the Chicago territory.

H. BORNSTEIN, who is in charge of the testing and research laboratory of the Deere Co., Moline, Ill., spoke on "Problems in Cast Iron Metallurgy" at the monthly meeting of the Wisconsin Gray Iron Foundry Group, held at the Hotel Schroeder, Milwaukee, Nov. 6.

L. E. ROARK, secretary of the Peoria Manufacturers' and Merchants' Association, has been elected president of the Illinois Industrial Council. The council consists of secretaries of associations of industrial communities in Illinois. A program of accident prevention is planned, as well as one of university training by the University of Illinois of promising students in the industrial field.

NORMAN LEONHARD, superintendent of the pattern-making department of

the Kissel Motor Car Co. for the last nine years, has resigned and has taken an interest in the Waukesha Pattern Works, Waukesha, Wis., established since 1926, but which has just been incorporated.

WILLIAM H. TEXTER, who has been in charge of market survey work for the National Association of Flat Rolled Steel Manufacturers, Cleveland, has been appointed assistant to R. J. KAYLOR, director of publicity for the Youngstown Sheet & Tube Co., Youngstown. Mr. Texter has been identified with the steel industry since 1913 in various capacities, and has been with the Flat Rolled Steel makers for a year and a half.

WILLIAM C. REITZ, HENRY J. MILLER, CHARLES E. BEESON and WILLIAM C. SUTHERLAND have been elected vice-presidents of the Pittsburgh Steel Co., Pittsburgh. Mr. Reitz continues as treasurer of the company and Mr. Miller as secretary. Mr. Beeson has charge of raw materials, and Mr. Sutherland, who was formerly assistant to the president, will remain in charge of the company's manufacturing activities. He was made a director of the company a short time ago. EMIL WINTER continues as first vice-president.

ROBERT M. KANIK has been named a director of the Appleton Steel Tube Co., Appleton, Wis. He is president and general manager of the Moloch Foundry & Machine Co., Kaukauna, Wis.

J. R. MORRIS, chief metallurgist of the Central Alloy Steel Co., Massillon, Ohio, was the speaker at the Nov. 5 meeting of the Tri-City chapter of the American Society for Steel Treating. He explained new developments in the process of nitriding steel.

F. J. HEPP, manufacturing engineer, Westinghouse Electric & Mfg. Co., East Pittsburgh, will speak at a meeting of the Pittsburgh Foundrymen's Association at the Fort Pitt Hotel, Pittsburgh, on Nov. 18. Mr. Hepp, who has spent approximately 55 years of his life in the foundry industry, will speak on "Memoirs of Patterns and Castings."

CHARLES O. HADLY, formerly vice-president in charge of sales of the Alan Wood Steel Co., Philadelphia, has joined the executive staff of the United States Steel Corporation at 71 Broadway, New York. For many years he has been prominent in the working out of distribution problems in the sheet steel industry.

A. M. Castle & Co. report net earnings of \$666,402 for the nine months ended Sept. 30, after all charges and taxes, equal to \$5.55 a share on the common stock. This compares with \$489,470 net, or \$4.15 a share, in the same period of 1928.

OBITUARY

CHARLES S. LE POER TRENCH, editor of the *American Metal Market* since 1899 and senior partner in C. S. Trench & Co., dealers in non-ferrous metals, New York, died in St. John's Hospital, Brooklyn, on Nov. 8, aged 75 years. He was born at Stadbroke, England, and came to the United States as a young man, iden-



C. S. LE POER TRENCH

tifying himself with White & Haskell, metal brokers, New York. In 1881, he organized C. S. Trench & Co. and was an outstanding figure in the metal trade during his entire business career. During the war, Mr. Trench was chairman of the British Red Cross and later was active in the British Great War Veterans of America. He was also president of the British Empire Chamber of Commerce in America.

JOSEPH W. DONNER, vice-president in charge of operations of the Donner Steel Co., Buffalo, died at his home in that city on Nov. 9, following a long illness, aged 35 years. He was born at Columbus, Ind., and was educated at private schools. After his graduation from Princeton University in 1917, he became identified with the Donner Steel Co., where he held various positions in the operating end of the business. He became general superintendent in January, 1926, and was made vice-president in May of this year.

HARRY C. HAIGHT, president, American Forge & Machine Co., Canton, Ohio, died on Nov. 4. He had been associated with the company since 1909.

W. E. GERLINGER, president of the Gerlinger Aluminum and Brass

Foundry Co., Milwaukee, and founder in the same city of the Gerlinger Electric Steel Casting Co. in 1902, from which he later withdrew, died at his home in Milwaukee, Nov. 3, aged 55 years.

W. J. RATTLE, who established the first firm of analytical iron ore chemists in Cleveland, died Nov. 5, aged 77 years. He was graduated from Sheffield Scientific School of Yale University in 1874 and opened offices in Cleveland four years later. Before the war he was called to Russia by the Imperial Government to consult on the developments of the Russian iron ore industries and he was engaged at various times in other foreign countries as a consultant. He retired about a year ago because of poor health.

HENRY AYLETT COLES, Atlanta, Ga., district manager for the Westinghouse Electric & Mfg. Co., East Pittsburgh, died recently at New Orleans. He was born in Virginia in 1870 and attended Roanoke College and the University of Virginia. He joined the Westinghouse company more than 30 years ago, and has been stationed at Atlanta since 1897.

CLARENCE R. CRAIN, superintendent of the Mattison Machine Works, Rockford, Ill., and president of the Rockford branch of the American Society for Steel Treating, died Oct. 29, aged 38 years.

Smaller Coal Production In 1928

Total production of bituminous coal last year is reported by the United States Bureau of Mines at 500,745,000 net tons, which is a decline of 3.3 per cent from the 517,763,000 tons mined in 1927. Maximum output was made in October, with 51,176,000 tons, and minimum in April, with 32,710,000 tons. The average number of working days in the year was 307, giving an average output of 1,631,000 tons each working day.

Anthracite production in 1928 is reported at 75,348,000 tons, a decline of 5.9 per cent from the 80,096,000 tons of 1927. Maximum production for the year was in October, with 8,400,000 tons, while the smallest month's output was that of July, with 4,394,000 tons. Working days amounted to 303½ in the year.

Production of bituminous coal in the 1929 calendar year to Nov. 2 is reported by the United States Bureau of Mines at 436,568,000 net tons. This is 8.8 per cent more than the 406,707,000 tons up to the same date in 1928, but is about the same as the 1927 output at the corresponding date.

Automobile Sales Adversely Affected in Large Cities

Automobile sales in metropolitan sections have declined as a consequence of stock market slump, and some cancellations of orders and a definite loss of interest by prospects have been reported. Sections of the country not directly affected by security trading apparently have felt no reaction, however, unless possibly a favorable one, according to *Automotive Industries*.

Some timidity has been exhibited by certain manufacturers, who have abandoned production schedules for the rest of the year, but too much importance should not be attached to this condition in view of the fact that schedules for production in many of these plants are naturally very low at this time pending the introduction of new models.

It is difficult to accept the argument that automobile factories in the United States and Canada will be able to match the production of 512,450 units turned out during the last two months of 1928, particularly as operating schedules as announced by a number of factories indicate a considerable recession from the October program.

Large Order Placed for Steel Office Equipment

The General Fireproofing Co., Youngstown, has received a contract to supply complete steel office equipment for the new \$8,000,000 office building which is being constructed at Hartford, Conn., by the Aetna Life Insurance Co.

W. H. Foster, chairman of the General Fireproofing Co.'s board of directors, says this is the largest single order of the kind ever placed. It includes hundreds of steel desks, filing equipment pieces, steel shelving, chairs, racks, cabinets and safes. It is to be completed by Jan. 1, 1931.

The fireproofing company is bringing to completion at Warren, Ohio, a new department to manufacture aluminum office chairs.

The Youngstown Pressed Steel Co. has started an addition to produce enameled ware, which will involve an expenditure of nearly \$500,000.

New Electrolytic Zinc Plant Started at St. Louis

Announcement has been made by the Evans-Wallower Lead Co., of the successful operation of its electrolytic zinc plant at East St. Louis, Ill. The roasters were started early in September and power was switched on the cellroom on Sept. 23. Output of cathode zinc at the beginning was 25 tons per day and production has been increased to the rated capacity of 50 tons daily. The new reagent developed by U. C. Tainton has been effective in preventing excessive atmospheric spray in the cellroom.

Varying Movements in European Markets

British Pig Iron Recovery and German Dullness—Japan to Make Steel Piling—French Scrutinize Wages

(By Cable)

LONDON, ENGLAND, Nov. 11.
PIG IRON is rather more active on domestic buying for forward delivery and some small lots of Cleveland iron have been sold for export. Output of pig iron is likely to be restricted temporarily, as Bolckow, Vaughan & Co. are blowing out two furnaces for repairs and arranging to resume operation of two others shortly.

At present, furnaces are generally well engaged through November, but are faced with continually increasing costs. Hematite iron is strong, with good domestic and export demand and East Coast, mixed numbers, has sold at £3 18s. (\$18.94) per ton for prompt shipment and £4 1s. (\$19.68) a ton for January delivery. The Steel Makers Association is leaving prices unchanged, contrary to the expectations of domestic users, who have bought heavily in anticipation of advances. Mills are now fairly well booked, but still lack export orders.

Tin plate is moderately active and prices are being maintained despite weakness in the tin market. Mills are well occupied and world consumption of tin plate is considered to be increasing steadily. Consequently, producers are optimistic of the future.

There is slightly more activity in

galvanized sheets, but, with lower costs, makers have accepted £12 15s. per ton (2.76c. per lb.), f.o.b., for No. 24 gage corrugated sheets in bundles, although the market is slightly higher. Black sheets are quiet.

A lockout of shipyard joiners, involving more than 10,000 men, has been declared by employers, effective Nov. 23.

The Stanton Ironworks Co., Not-

tingham, is starting a new plant for production of De Lavaud centrifugal cast iron pipe, which will increase its output by 15 miles a week.

Continental iron and steel prices are steadier as a result of the International Steel Cartel's decision to reduce production. The situation is complicated, however, by increased export demand experienced by British traders, while mills report cancellations.

German Steel Business Declines

Buyers Await Renewal of Syndicates—Exports Suffer From Belgian and American Competition

BERLIN, GERMANY, Oct. 25.—The business outlook is uncertain. Steel production is still at a higher rate than in 1928, but buying has fallen off considerably. Domestic steel prices for November are unchanged, but further weakness has developed in the export market. As a result, the Ingot Steel Syndicate has made another increase in its price rebates to exporting manufacturers on certain steel products. For November these rebates are, per metric ton: ingots, 12 m. (\$2.86); billets, blooms

and slabs, 19 m. (\$4.52); structural shapes, 36 m. (\$8.57); steel bars, 33 m. (\$7.85); bands, 42 m. (\$10); wire rods, 21.50 m. (\$5.12); and heavy-gage sheets, 20 m. (\$4.76). There has been considerable discussion of rebates during recent negotiations for renewal of the domestic syndicates, and manufacturing consumers generally agree that the system is materially aiding export trade in machinery and electrical equipment.

Some of the caution now being shown by iron and steel buyers is at-

British and Continental European Export Prices per gross ton, f.o.b. United Kingdom Ports, Hamburg and Antwerp, with the £ at \$4.85

British Prices, f.o.b. United Kingdom Ports

Cleveland No. 3 foundry	£3 12½s.	to £3 13½s.	\$17.58	to \$17.82
East Coast hematite...	3 18	to 3 18½	18.94	to 19.15
Ferromanganese, export	13 10	to 14 0	65.47	to 67.90
Billets, open-hearth...	6 5	to 6 7½	30.31	to 30.92
Sheet bars, open-hearth	6 5	to 6 10	30.31	to 31.52
Black sheets, Japanese specifications	12 12½		61.22	
Tin plate, per base box	0 18¾	to 0 19	4.54	to 4.60
Rails, 60 lb. and heavier	7 15	to 8 15	37.59	to 42.43
Cents per Lb.				
Steel bars, open-hearth...	7 15	to 8 10	1.67	to 1.84
Beams, open-hearth...	7 2½	to 7 12½	1.55	to 1.65
Channels, open-hearth...	7 7½	to 7 17½	1.60	to 1.71
Angles, open-hearth...	8 2½	to 8 12½	1.76	to 1.86
Ship plates, open-hearth	7 12½	to 8 2½	1.66	to 1.76
Black sheets, No. 24 gage	10 0	to 10 5	2.17	to 2.21
Galvanized sheets, No. 24 gage	12 15	to 13 5	2.76	to 2.87

Continental Prices, f.o.b. Antwerp or Hamburg

Foundry iron, 2.50 to 3.00 per cent sil., 0.50 to 0.90 per cent phos.	£3 8s.	to £3 11½s.	\$16.49	to \$17.33
Foundry iron, 2.50 to 3.00 per cent sil., 1.00 per cent and more phos.	3 7	to 3 8	16.24	to 16.49
Billets, Thomas	4 13	to 4 13½	22.56	to 22.80

Sheet bars, Thomas...	4 12	to 4 12½	22.31	to 22.43
Wire rods, low C., No. 5 B.W.G.	6 3	to 6 5	29.82	to 30.30
Black sheets, No. 31 gage, Japanese	12 6	to 12 7½	59.65	to 60.02
Rails, 60 lb. and heavier	6 8½	to 6 10*	31.16	to 31.52
Rails, light	6 1½		29.46	
Cents per Lb.				
Steel bars, merchant...	5 5	to 5 7½	1.14	to 1.16
Steel bars, deformed...	5 3	to 5 4	1.12	to 1.13
Beams, Thomas, British standard	4 19	to 5 5	1.07	to 1.14
Channels, Thomas, American sections	5 14	to 5 18	1.25	to 1.27
Angles, Thomas, 4-in. and larger, over ¾-in. thick	5 2	to 5 7½	1.09	to 1.16
Angles, Thomas, 3-in.	5 6		1.14	
Ship plates, open-hearth inspected	7 5		1.61	
Hoop and strip steel over 6-in. base	5 12½		1.20	
Wire, plain, No. 8 gage	7 2½	to 7 3½	1.54	to 1.55
Wire, galvanized, No. 8 gage	8 15	to 8 16	1.87	to 1.89
Wire, barbed, 4-pt. No. 12 B.W.G.	11 10		2.49	
Wire nails, base	0 7¼		\$1.75	per keg
Wire nails, assortments, 1 to 6-in. keg	10 6¼		2.23	

*Open-hearth steel, 10s. (\$2.42) per ton extra.

tributed to the doubtful outlook for both domestic and foreign business and also to the uncertainty about the renewal of many of the syndicates. Within a month meetings will be held of the Ingot Steel Syndicate, the "A" Products Syndicate and the Steel Bar Syndicate. To simplify the negotiations it has been agreed that all these syndicates, including the Wire Rod Syndicate, shall expire simultaneously, probably Jan. 31.

The demand of the Friedrich Krupp A.G. for a 175,000-ton quota in the Ingot Steel Syndicate is reported to have been withdrawn. This move is expected to pave the way for an agreement among the Krupp works, the Mannesmann Tube Co. and the United Steel Works. However, the plan of the Friedrich Krupp A.G. to establish a new tube mill of large capacity has not yet been abandoned and constitutes a serious threat to renewal of the German Tube Syndicate. Negotiations in the Ingot Steel Syndicate will involve redistribution of quotas, and a decision on separation of export from domestic allotments. On this latter question there is a wide divergence of opinion between producers selling largely in the domestic market and mills producing almost exclusively for export.

The prospect of renewal of the International Steel Cartel has improved, following the reported abandonment by Belgium of opposition to the establishment of price-fixing, selling organizations for separate products. This change in attitude is said to have resulted from a decline in prices and business in Belgian export trade.

Foreign Trade Threatened

It appears doubtful that the present high rate of steel production will be maintained much longer, as trade is declining slowly. Curtailed exports will probably be reflected in reduced German purchases of American cotton, copper and other materials. The situation in the export market is illustrated by a comparison of German and Belgian prices. Although German mills state that they are selling abroad at present quotations without profit, German prices are still higher than Belgian. German blooms, for example, are quoted at £4 14s. 6d. (\$22.95), and Belgian at £4 5s. 6d. (\$20.78) per metric ton, f.o.b. Antwerp; German billets at £4 15s. 6d. (\$23.21) per ton and Belgian at £4 11s. 6d. (\$22.23), Antwerp; German shapes at £5 1s. per ton (1.11c. per lb.) and Belgian at £4 18s. per ton (1.08c. per lb.); German steel bars at £5 4s. per ton (1.15c. per lb.) and Belgian at £5 3s. per ton (1.13c. per lb.).

German steel exports can apparently be maintained only by further reductions in prices. Recently certain producers, including the mills at Essen, have reported increasing competition in South American markets from American mills and a resultant decline in German business. Exports to the Far East have receded, also, Chinese buying being at a minimum.

Japan to Roll Steel Piling

German Design Considered — Government Works May Install Rail Steel Bar Mill to Reroll Short Rails

YOKOHAMA, JAPAN, Oct. 15.—The Seitetsu Jo (Government Works) is increasing its steel making capacity and adding new products to its output. It is planned to build a new plant at Horaoka, replacing the company's No. 1 mill, which is to be removed from Yawata and rebuilt. Present plans call for an annual output of 500,000 metric tons of steel ingots from either seven or eight furnaces of not less than 100 metric tons capacity.

Recently the various designs of sheet steel piling imported by Japan have been investigated by the company with a view to developing a special Japanese design. Japan imported 22,000 metric tons of the various types of steel piling in 1928. It has now been decided to obtain the patent rights for Japan on the most desirable design, and Larssen piling, manufactured by the Vereinigte Stahlwerke A.G. in Germany, is understood to have been selected.

For some months the Seitetsu Jo has been trying to find an outlet for short-length and other waste rails, an increasing tonnage of which has become available as output of the rail mills has mounted. Part of these off-grade rails has been purchased by the Imperial Government Railways, but there is still a considerable tonnage, which cannot be economically charged into the open-hearth furnace as heavy melting steel. In certain districts small quantities of these waste rails have been used by cutlery makers. Recently the possibility of installing a mill to roll rail steel reinforcing bars, fence posts and similar material, as in the United States, has been considered, and it has been suggested also that these rails might be rolled flat for use in manufacturing scoops and shovels.

The Vereinigte Stahlwerke, A. G., recently licensed the Cargo Fleet Iron Co., Ltd., Middlesbrough, England, to roll Larssen steel piling for distribution in Great Britain and the British dominions and colonies.

New British Steel Merger Being Considered

LONDON, ENGLAND, Nov. 2.—Merger of the Pearson & Knowles Coal & Iron Co., Ltd., Warrington, with Sir W. G. Armstrong, Whitworth & Co., Ltd., is contemplated. The latest report from the latter interests is that the iron and steel business of the Pearson & Knowles group of companies is being carefully studied with this end in view. The Pearson & Knowles group has a weekly capacity of about 2700 tons of finished iron and steel from 45 puddling furnaces, six bar mills, four hoop mills and one wire rod mill. It draws its steel supplies

from the Partington Steel & Iron Co., Ltd., which it controls.

In 1920 Sir W. G. Armstrong, Whitworth & Co., Ltd., acquired a controlling interest in the Pearson & Knowles Coal & Iron Co., by purchase of its stock. With the exception of two of its coal properties all the companies in the group have shown a general improvement in earnings.

American Motor Car Builder Studies French Wages

BORDEAUX, FRANCE, Nov. 1.—Investigations of wage rates paid by the automobile industry in various Continental countries, now being made by a leading American automobile manufacturer, have attracted considerable attention in France. There is much conjecture as to the use that will be made of this information and a belief in some quarters that it portends large production operations by this manufacturer in some European country, possibly France.

It is pointed out that, if American automobile builders start production in the French market and offer a higher rate of wages than the standard in France, French producers can follow their lead and also advance the wage level. It is argued, however, that, if higher wages should prove unprofitable in France, the first to be forced to suspend them would be the French factories, since they have less capital than the American builders.

Russia Suggests Manganese Agreement

HAMBURG, GERMANY, Nov. 1.—The Russian Government, which controls the Georgian Manganese Ore Co., has approached producers in South Africa, India and Brazil with an offer to negotiate an agreement to prevent further price reductions, according to the official Government trade publication *Ekonomitscheskaja Shin*. It is believed that negotiations will result in stabilized world prices of manganese ore.

Italian Steel Companies to Be Merged

The Societa Altiforni & Acciaierie D'Iva, a leading Italian steel company, with capital stock totaling 300,000,000 lire (\$15,705,000), will absorb the Societa Anonima Franchi Gregorini of Brescia, with capital of 90,000,000 lire (\$4,711,500), and the Societa Anonima Ferriere di Veltri of Genoa, with capital of 45,000,000 lire (\$2,355,750), according to a report to the Department of Commerce. Financing is to be through the Banco Commerciale and Credito Italiano.

Machinery Markets and News of the Works

Tool Sales Drop Slightly

Machinery Business Feels Some Effects of Stock Market Crash—Outlook Still Uncertain

WHILE orders and inquiries for machine tools are described as "better than fair," there has been some falling off in the past week. Most significant, perhaps, is the fact that some prospective business will not be placed because of curtailment of manufacturing programs of the companies which were to buy. This is most noticeable in aircraft, radio and electric refrigerator lines. Deliveries on a few machine tool orders recently placed have been held up, at least temporarily.

On the other hand, some companies are going ahead with plans for 1930 without regard for any possible effect on business that the recent stock market break may have. Within the past week sales of tools have been made with deliveries extending as far ahead as April.

Machine tool plants are well filled with orders, and few are able to make shipments of tools until after Jan. 1.

The effect which the collapse in security values may have is discussed by

the National Machine Tool Builders in its November bulletin, which says that "we are pretty sure to find a goodly recession in demand on account of the stock market smash."

This report says that some cancellations have already developed from "the over-enthusiastic aircraft industry and perhaps such cancellations might develop in other industries due to lack of business confidence."

The association adds, however, that "a period of falling demand will not be entirely unhealthy."

"Unfortunately for the machine tool industry," says the report, "the motor industry is the sore spot in the whole business structure at this time, and the motor industry has been the largest single source of machine tool orders for many years past. As the motor industry is quite close to its saturation point, we need not expect in the future as many orders from the motor industry as a whole because that industry is stopping its expansion."

New York

NEW YORK, Nov. 12.—As expected, the recent stock market collapse has had an almost immediate effect on the manufacturing programs of companies engaged in the so-called luxury class of goods. Curtailment has occurred in the production of electric refrigerators and radios. A large manufacturer of radio tubes has postponed contemplated purchases of machine tools because of the probability of a reduced demand for its product. Spotty conditions are developing in the local machine tool trade, though some sellers declare that sales and inquiries are still "better than fair." Others report a decline in volume of orders booked thus far in November, as compared with October volume. In contrast with this situation, it is significant that within the week tools have been sold for shipment as far ahead as next April. During the remainder of the year ma-

chine tool sales will undoubtedly be governed to a large extent by the business prospects of individual companies and to a lesser extent than usual by inventory considerations which ordinarily are a factor at the end of every year. Scarcely any machine tools purchased now can be delivered until after Jan. 1, and most inventories are completed by that time.

Keystone Foundry Co., Essex Street, Brooklyn, manufacturer of iron castings, has engaged E. M. Edelson, 26 Court Street, architect, to prepare plans for two one-story foundry units, 95 x 100 ft., to cost about \$60,000 with equipment.

Board of Education, Amsterdam, N. Y., is considering installation of manual training department in high school in Northampton Park, to cost \$600,000, for which plans are being drawn by H. F. Daly, 15 East Main Street, architect.

Following recent acquisition by Western Electric Co., 195 Broadway, New York, of Turner-Armour Corporation, 1201 Flushing Avenue, Brooklyn, with

branch plant at 6600 Metropolitan Avenue, Queens, manufacturer of telephone booths, etc., purchasing company is arranging to increase production of new type metal-lined telephone booths from 1600 to 2000 units per month. F. A. MacNutt is works manager.

Leviton Mfg. Co., 226 Newell Street, Brooklyn, manufacturer of electrical porcelain specialties, has awarded general contract to W. P. McGarry Co., 2929 Freeman Avenue, for four-story plant, 105 x 160 ft., to cost more than \$135,000 with machinery, presses, etc.

Board of Education, Park Avenue and Fifty-ninth Street, New York, has plans for a power house for institutional building at Jerome Park reservoir, project to cost \$750,000 with equipment. Thompson, Holmes & Converse, 101 Park Avenue, New York, are architects.

Nevins Shipyard, City Island, New York, has plans for two-story shop addition, to cost about \$30,000 with equipment. Franklin, Bates & Heindsmann, 2526 Webster Avenue, are architects.

Claude Neon Electrical Products Corporation of Delaware, affiliated with Claude Neon Lights, Inc., 41 East Forty-second Street, New York, manufacturer of tube electric lights, etc., has arranged for consolidation with Claude Neon Electrical Products Corporation of Oregon, Inc., and will consolidate with organization. It is planned to expand production on Pacific Coast.

Van Wart & Wein, 347 Madison Avenue, New York, architects, have plans for a one-story machine shop, 100 x 215 ft., at Long Island City, to be occupied by a company whose name is temporarily withheld, represented by T. Steele, 482 Vernon Boulevard, Long Island City.

William Shary, 22 East Seventeenth Street, New York, architect, has filed plans for a multi-story automobile service, repair and garage building at 12-16 East Thirteenth Street, to cost about \$125,000 with equipment.

United States Nickel Co., at North Brunswick Township, near New Brunswick, N. J., has arranged for dissolution of company, and plant will be discontinued. Production will be continued by parent organization, Usines De Nickel De La Nethe, with plant at Duffel, Belgium. Walter C. Kerrigan, Highland Park, N. J., is secretary and treasurer of United States Nickel Co., and is said to be planning to place company plant on market.

Driver-Harris Co., Middlesex Street, Harrison, N. J., manufacturer of wire products, will soon take bids for about seven two and three-story additions, to cost over \$350,000 with equipment. J. A. Finegan, 776 Broad Street, Newark, is architect.

Kirchhof Patent Co., Newark, manufacturer of tin toys and other metal novelties, has removed its plant from 30 Stirling Street to a larger factory at 60-64 Union Street, where production will be expanded.

Warren Foundry & Pipe Co., Sitgreaves

Street, Phillipsburg, N. J., is considering rebuilding one-story unit destroyed by fire Nov. 2.

Tung Sol Lamp Works, Inc., 95 Eighth Avenue, Newark, manufacturer of radio tubes and equipment, has taken bids on general contract for a four-story addition, 100 x 150 ft., to cost more than \$125,000 with equipment. Fougner & Gautier, 103 Park Avenue, New York, are architects.

Beaver Mfg Co., 625-45 North Third Street, Newark, manufacturer of electric wiring devices, switches, etc., has completed a two-story addition, 50 x 100 ft., and will use in part for a new assembling department.

Hackensack Water Co., Park Avenue, Weehawken, N. J., has plans for an equipment storage and distributing plant on Hackensack Avenue, Hackensack, with automobile service, repair and garage building for company cars and trucks, to cost over \$85,000. C. V. R. Bogert, 210 Main Street, Hackensack, is architect.

Charles Miller & Co., Secaucus Road, North Bergen, N. J., have superstructure under way on two-story addition, 38 x 110 ft., to be equipped as a cooling and freezing department for adjoining three-story meat-packing plant, with part to be used as an engine room, to cost over \$70,000 with equipment. Otto S. Schlick, 136 Liberty Street, New York, is architect and engineer.

New England

BOSTON, Nov. 11.—Although machine tool dealers report sales larger than a week ago, the trade in general describes the market as dull. Some prospects have signified intentions of closing in December, but more have postponed purchases until after Jan. 1. Dealers have figures out on a large number of tools, however, and buying, when resumed, in all probability will be good. New England machine tool builders report a further falling off in bookings, but deliveries are still unsatisfactory to a majority of users. Metal-working plants are not so busy as in October, but more active than in November last year. The present let-down in operations is seasonable.

New England Fuel & Transportation Co. will build coal elevators at 140 Ballou Avenue, Dorchester district, Boston; also a coke storage plant at 140 Abattoir Avenue, Brighton district.

Fairfield County Ice Co., Stamford, Conn., has awarded a contract for a one-story plant, 80 x 220 ft., for which miscellaneous electrical and other equipment is required.

Boston & Maine Railroad will soon begin work on a locomotive coaling plant at Worcester, Mass. Conveying equipment will be purchased.

William E. Arnold Co., Malden, Mass., will erect a machine shop to cost \$25,000 without equipment.

International Silver Co., Meriden, Conn., closed bids Nov. 8 on one, two and three-story additions and alterations. Company has under consideration purchase of drop hammers.

Electric Specialty Co., Stamford, Conn., has awarded a general contract for a two-story addition, 44 x 120 ft.

N. D. Cass Co., Athol, Mass., maker of toys, has purchased International Toy Corporation, New Bedford, Mass., and

The Crane Market

NEW inquiry for locomotive cranes has improved in the past week, and the market for used equipment is showing increased activity. The Tide Water Oil Co., 11 Broadway, New York, is inquiring for a 25-ton locomotive crane, the Standard Oil Co. of New Jersey for two 25-ton locomotive cranes for Bayway, N. J., and the Anglo-Chilean Consolidated Nitrate Corporation, New York, for a 25-ton and a 35-ton locomotive crane for export. The Bethlehem Shipbuilding Corporation, Bethlehem, Pa., has not yet closed on a 50-ton locomotive crane. Overhead crane inquiry continues rather limited. Among inquiries expected to close soon is a 25-ton, 1-motor overhead crane for the Phoenix Utility Co., 71 Broadway, New York.

Among recent purchases are:

Magnolia Petroleum Co., New York, 35-ton, 32-ft. 11¼-in. span, overhead crane for Beaumont, Tex., from Box Crane & Hoist Corporation.

E. I. du Pont de Nemours & Co., Wilmington, Del., 10-ton, 27-ft. span electric traveling crane from Shepard Niles Crane & Hoist Corporation.

Sinclair Refining Co., New York, 10-ton, 42-ft. span, electric crane for new refinery at Wellsville, N. Y., from Maris Brothers.

General Electric Co., Schenectady, N. Y., four 2-ton electric cranes for Bloomfield, N. J., from Shepard Niles Crane & Hoist Corporation.

Chicago, Rock Island & Pacific, 10-ton, 30-ft. span, 2-motor stationary gantry crane from Whiting Corporation.

Navy Department, Mare Island, Cal., 30-ton, steam-driven locomotive crane from Orton Crane & Shovel Co.

St. Louis River Mercantile Co., Cloquet, Minn., 30-ton oil driven locomotive crane from Orton Crane & Shovel Co.

Monessen Southwestern Railroad, Monessen, Pa., 30-ton, gasoline operated locomotive crane from Orton Crane & Shovel Co.

will move machinery to Athol. New metal-working equipment will be purchased later.

Stanley Electric Tool Co., New Britain, Conn., a subsidiary of Stanley Works, has been incorporated. New company has acquired Unishear Co. and Ajax Electric Hammer Co., both of New York, and will manufacture products of these concerns together with electric machinery formerly made by Stanley Rule & Level Co. at New Britain.

City Council, New Britain, Conn., is planning purchase of property for a municipal airport, to include hangar, repair shop, oil storage and other structures, to cost more than \$75,000 with equipment. R. W. Whitman, councilman, is member of committee in charge.

Boston Ice Co., 11 Deerfield Street, Boston, has acquired property on East Eagle Street, and contemplates new plant, to cost more than \$90,000 with machinery.

Fenn Mfg. Co., 1841 Broad Street, Hartford, Conn., manufacturer of special machinery, tools, etc., has awarded general contract to R. G. Bent Co., Inc., 93 Edwards Street, for one-story top addition, to cost about \$30,000 with equipment.

United States Rubber Co., Providence, R. I., has asked bids on general contract for addition to mill on Valley Street, to cost over \$50,000 with equipment. Lockwood Greene Engineers, Inc., 24 Federal Street, Boston, is architect and engineer. Headquarters of company are at Broadway and Fifty-eighth Street, New York.

duPont Viscoloid Co., Leominster, Mass., has awarded contract to Wiley & Foss, Fitchburg, Mass., for addition to plant for manufacture of new type of safety glass for automobiles, to cost about \$1,000,000 with machinery. Company will rebuild small unit at plant recently damaged by fire.

Philadelphia

PHILADELPHIA, Nov. 11.—Wicaco Screw & Machine Works, Inc., 4801 Stenton Avenue, Philadelphia, has awarded general contract to Paul Brosz, 2515 West Huntingdon Street, for a one-story addition, to cost about \$30,000 with equipment.

Tilden, Register & Pepper, 1608 Walnut Street, Philadelphia, architects, have filed plans for a multi-story automobile service, repair and garage building at 1616-26 Walnut Street, to cost more than \$350,000, of a gross expenditure of \$2,000,000 to be made for other building at same location.

Shell Eastern Petroleum Products, Inc., 122 East Forty-second Street, New York, a subsidiary of Shell Union Oil Co., Shell Building, St. Louis, has purchased 4½-acre tract on Schuylkill River, near Grays Ferry Bridge, Philadelphia, and plans early construction of oil storage and distributing plant, to cost more than \$125,000 with equipment. Property was formerly occupied by Philadelphia Rubber Co.

Mechanical handling equipment will be installed in new one-story loading station to be built by Freihofer Baking Co., Twentieth Street and Indiana Avenue, Philadelphia, to cost about \$75,000. General contract has been let to Philip Halbach Contracting Co., 1261 North Twenty-sixth Street.

Brockway Motor Truck Corporation, 4500 Woodland Avenue, Philadelphia, with plant at Cortland, N. Y., has awarded general contract to Nelson Pedley Construction Co., 9 South Sixteenth Street, for a service, repair and sales building, to cost over \$90,000 with equipment. Eugene A. Stopper, Fuller Building, is architect.

Ralph B. Bencker, Horn Building, Philadelphia, architect, has plans for a six-story and basement factory, 90 x 95 ft., to be known as the Jewelry Trade Building, for precision and light manufacturing in this industry, to cost \$250,000.

Public Service Electric & Gas Co., Trenton, N. J., with headquarters at Public Service Terminal Building, Newark, N. J., has plans for an equipment storage and distributing plant, with mechanical and electrical repair departments, to cost \$100,000 with equipment. Work will be in charge of Public Service Production Co., same address, an affiliated organization.

Central Transportation Co., Broad Street Bank Building, Trenton, has plans for a one-story motor bus service, repair and garage building, 100 x 250 ft., for company use, reported to cost about \$85,000 with tools and equipment.

School Board of Lower Wakefield Township, Yardley, Pa., is considering installation of manual training equipment in new two-story high school to cost \$160,000, for which plans will be drawn

by Heacock & Hokanson, 1211 Chestnut Street, Philadelphia, architects.

Autocar Co., Ardmore, Pa., manufacturer of motor trucks, has approved increase in capital from 100,000 shares of stock, \$100 par value each, to 600,000 shares, no par value, part of proceeds to be used for expansion.

State Board of Education, Trenton, N. J., will have plans drawn soon for power plant for new school group at Hillwood Lake, entire project to cost \$985,000, which amount has been authorized by State.

Stacy Paper Box Co., Ewing and Ogden Streets, Trenton, N. J., manufacturer of corrugated and other paper folding boxes and containers, has leased local factory units held by Trent Corporation, and will occupy what is known as Building No. 1 for new plant. Present factory will be removed to new location and capacity increased. Expansion will cost more than \$40,000 with equipment.

South Atlantic

BALTIMORE, Nov. 11.—Victor Cooler Door Co., Inc., First National Bank Building, Hagerstown, Md., manufacturer of insulated refrigerator doors, etc., has awarded general contract to J. B. Ferguson Co., 39 West Washington Street, for one-story addition to plant on Frederick Street, to cost over \$100,000 with equipment.

Baltimore & Ohio Railroad Co., Baltimore, has awarded general contract to Olga Construction Co., Chicago, for new coal tipple at Fairmont, W. Va., with electric hoists and other mechanical handling equipment, to cost over \$60,000. H. A. Lane is chief engineer.

Webb Packing Co., Crisfield, Md., meat packer, has authorized immediate erection of new branch plant at Salisbury, Md., on site recently acquired, to include refrigerating department, mechanical-handling equipment, etc., to cost about \$140,000.

H. Warwick, Vermont Avenue, N. W., Washington, architect, has plans for a three-story automobile service, repair and garage building, to cost about \$100,000 with equipment.

Virginia Electric & Power Co., Richmond, Va., has acquired local property and plans construction of two-story equipment storage and distributing building, with mechanical and electrical repair divisions, 125 x 300 ft., to cost more than \$150,000 with equipment. Carneal, Johnson & Wright, Electric Building, are architects.

Dominion Oil Co., Richmond, Va., has plans for oil storage and distributing plant, to cost \$125,000 with equipment.

Horace E. Dodge Boat & Plane Corporation, 3 East Fifty-second Street, New York, Horace E. Dodge, president, recently organized to take over Horace E. Dodge Boat Works, Inc., 614 Lycaste Avenue, Detroit, has awarded general contract to Virginia Engineering Co., First National Bank Building, Newport News, Va., for new plant at Newport News, where 100-acre tract was lately purchased. Plant will consist of several units for parts manufacture and assembling of motor boats, flying boats and amphibian planes, with power substation, boiler house, dock and other miscellaneous structures, to cost about \$1,000,000. It is proposed to construct additions later to more than triple this investment. Plant at Detroit will be removed to new location. Philip L. Small

& Associates, Terminal Tower Building, Cleveland, are architects and engineers.

Maryland Bolt & Nut Co., Mount Washington, Baltimore, has awarded general contract to Consolidated Engineering Co., 20 East Franklin Street, for two-story addition, 30 x 60 ft., to cost about \$20,000 with equipment.

Curtiss Airports Corporation, 27-29 West Fifty-seventh Street, New York, has begun construction of two hangars, with repair facilities at new airport at Baltimore, where 260-acre tract will be laid out for this purpose. Oil storage and distributing building and other units will be built, followed by administration building in spring. Entire project will cost more than \$100,000. Kenneth Franzheim, 345 Madison Avenue, New York, is architect. General contract is in charge of Stone & Webster Engineering Corporation, 49 Federal Street, Boston, engineer and contractor.

Boland Mfg. Co., Greenville, S. C., manufacturer of shuttles and other textile mill equipment, has taken over property on Old Ensley Road, and will operate temporary plant at that location. New plant will be built later.

Pittsburgh

PITTSBURGH, Nov. 11.—Dealers report sufficient business in prospect to keep local offices well occupied. New inquiry is appearing daily, but lists of more than a few tools are exceptional. Purchases are being made in the same way, although awards are expected in the next few days on the Pittsburgh Board of Education's list which closed last week and included a considerable number of tools.

Many large steel companies whose operations have been considerably reduced in the last few weeks are taking advantage of the opportunity to make additions and repairs to equipment. Builders of heavy machinery are well occupied and the time of delivery is often the deciding factor in placing an order.

Edgewater Steel Co., Oakmont, Pa., has asked bids on general contract for two-story addition, to cost about \$45,000 with equipment. Part of unit will be used for testing.

Semler Co., Jeannette, Pa., manufacturer of steam and water pipe fittings, flanges and flange unions, etc., has awarded general contract to J. E. Myers, Jeannette, for one-story addition, totaling about 10,000 sq. ft. floor space, primarily for manufacture of brass fittings, to cost about \$35,000 with machinery.

Firestone Tire & Rubber Co., Akron, Ohio, will soon call for bids for three-story factory branch, storage and distributing plant at Pittsburgh, to cost more than \$225,000 with equipment. Lockwood Greene Engineers, Inc., Hanna Building, is architect and engineer.

Austin Motor Car Co., Butler, Pa., recently organized to take over part of plant of Standard Steel Car Co., has plans by A. J. Brandt Co., 412 Stormfeltz Building, Woodward Avenue and Grand Boulevard, Detroit, engineer, for extensions and improvements, to cost about \$100,000. List of equipment is being arranged. Mr. Brandt is interested in Austin company.

Dunbar Flint Glass Co., Dunbar, W. Va., has plans for extensions and improvements, including installation of batch-mixing, mechanical-handling and other apparatus, to cost about \$200,000.

Globe Brick Co., Kenilworth, W. Va., has awarded general contract to Austin Co., Euclid Avenue, Cleveland, for two additions, one-story, 65 x 225 ft., and two-stories, 40 x 60 ft., for production of glazed face brick, to cost about \$100,000 with machinery.

K. Simon, 160 Fullerton Street, Pittsburgh, operating a wagon building and repair works, will soon take new bids on revised plans for a two-story addition, 45 x 65 ft., to cost \$45,000 with equipment. A. R. Douglass, Benedum Trees Building, is architect.

Acme Steel Co., Glassmere, Pa., manufacturer of electric steel castings, is making additions to its foundry buildings, 80 x 200 ft. and 40 x 80 ft., and will install additional crane, annealing oven, core ovens, air compressor and other equipment. Capacity will be increased 60 per cent.

Buffalo

BUFFALO, Nov. 11.—Sterling Engine Co., 1250 Niagara Street, Buffalo, manufacturer of gas engines, parts, etc., has filed plans for one-story addition, to cost about \$80,000 with equipment.

Walker Lee, Jr., Powers Building, Rochester, N. Y., architect, has awarded general contract to William Kenny, 86 Frost Avenue, for five-story automobile service, repair and garage building, to cost about \$100,000 with equipment.

Officials of Houdaille-Hershey Corporation, 537 East Delavan Avenue, Buffalo, manufacturer of automobile shock absorbers, have organized Houdaille Co. of Canada, Ltd., a subsidiary, to construct and operate a branch plant at Bridgeburg, Ont., initial unit to cost more than \$75,000 with equipment.

Rochester Button Co., 300 State Street, Rochester, has leased property at Akron, N. Y., and will install machinery early in December for a branch plant. Equipment will be provided for employment of about 100 persons. Joseph D. Tonkin is general manager.

Sun Oil Co., 1609 Walnut Street, Philadelphia, is asking bids on general contract for a new storage and distributing plant at Tonawanda, N. Y., including automobile service, repair and garage building for company trucks and cars, to cost about \$200,000 with equipment.

Board of Education, Fayetteville, N. Y., is considering installation of manual training equipment in new senior and junior high school in Wellwood section, to cost about \$300,000. Carl C. Ade, 89 East Avenue, is architect.

Erie Railroad Co., 50 Church Street, New York, is considering addition to locomotive repair shops at Hornell, N. Y., 150 x 150 ft., to cost more than \$85,000 with equipment. R. C. Falconer, address noted, is chief engineer.

Quisenberry Feed Mfg. Co., 95 Kentucky Avenue, Buffalo, has filed plans for six-story addition to mill, including grain elevator with screening, conveying, hoisting and other equipment, to cost about \$100,000. S. T. Edwards, 110 South Dearborn Street, Chicago, is engineer.

Westcott Chuck Co., Oneida, N. Y., has appointed G. L. Hunt, Bourse Building, Philadelphia, its representative in that territory, which includes eastern Pennsylvania, Maryland, Delaware and southern New Jersey. Other recent appointments are: Buffalo, Noxsel-Stroman Co., 14 East Tupper Street; Chicago, S. A. Dinsmore, 327 South La Salle Street; Los Angeles and San Francisco, K. D. Carl-

son Co., 268 Market Street, San Francisco; Pittsburgh, F. A. O'Donnell, 1509 First National Bank Building.

Universal Pressing Machine Co., Inc., recently organized at Utica, N. Y., with Cambell B. Hodges, president, will establish a plant in former Otis Boiler works, Oswego, N. Y. Operations are expected to begin about Jan. 1.

Detroit

DETROIT, Nov. 11.—Following recent consolidation with Thomson Electric Welding Co., Lynn, Mass., Gibb Welding Machines Co., Bay City, has secured three-acre tract for expansion, to cost over \$75,000 with equipment. Consolidated company will be known as Thomson-Gibbs Electric Welding Co.

Detroit Die-Casting Co., 442 East Jefferson Avenue, Detroit, has asked bids on general contract for one and two-story plant unit, to cost about \$70,000 with equipment.

National Utilities Co., Monroe, Mich., operating electric and gas properties, has purchased 22-acre tract about two miles from city, as site for new artificial gas plant, with a capacity of 1,000,000 cu. ft. daily. New storage and distributing facilities will be provided with capacity of 300,000 cu. ft. Present gas generating plant will be used for auxiliary service. Entire project will cost over \$700,000.

Kelsey Wheel Co., 3600 Military Avenue, Detroit, manufacturer of steel automobile wheels, etc., has asked bids on general contract for a one-story addition, 130 x 320 ft., to cost about \$100,000 with equipment. Albert Kahn, Inc., Marquette Building, is architect and engineer.

Board of Trustees, University of Detroit, Livernois Avenue and Six-Mile Road, Detroit, has plans for a new two-story engineering building, adjoining present structure, to cost more than \$100,000 with equipment. Malcolmson & Higginbotham, 1219 Griswold Street, are architects.

Evans Auto Loading Co., Union Trust Building, Detroit, manufacturer of automobile loading devices and equipment, is completing new branch plant at Marshfield, Ore., to cost about \$400,000.

Thompson Aeronautical Corporation, Union Trust Building, Cleveland, manufacturer of aircraft and automobile equipment and parts, has plans for new plant at Pontiac, Mich., including one-story shop and office, 40 x 120 ft.; hangar, 120 x 120 ft., with repair and reconditioning facilities; one-story engine-testing house, 15 x 24 ft.; boiler house and other units, to cost \$375,000 with equipment.

White Star Refining Co., 903 West Grand Boulevard, Detroit, has begun construction of new lubricating oil plant, to cost more than \$90,000 with equipment. It will also build a storage and distributing plant, and sign-manufacturing unit, to cost over \$75,000 with equipment. A new oil refinery at Trenton, Mich., representing an investment of more than \$2,000,000, was recently completed.

Wayne County Board of Commissioners, Barlum Tower, Detroit, will soon take bids on revised plans for one-story county power plant, to cost about \$70,000 with equipment. Giffels & Vallet, Marquette Building, are architects and engineers.

Yellow Sleeve Valve Engine Works, Inc., East Moline, Ill., a subsidiary of General Motors Corporation, manufacturer of engine valves and other equipment, is planning early removal of plant

to Pontiac, Mich., where part of engine works of parent organization has been taken over. Additional facilities will be installed for enlarged output.

Chicago

CHICAGO, Nov. 11.—In general, the past week has been rather quiet for the machine tool trade. Scattered orders have been added to books, but the bulk of this business is of old standing. New inquiries are at the lowest point in many weeks. Contrary to the trend of the general market, there have been a few orders for duplicates of machines purchased earlier in the year. Salesmen reporting to home offices do not find that recent rapid changes in the security market have resulted in dropped programs or in cancellations. Tool and die shops having contracts with the Western Electric Co. are still busy. However, jobbing shops that have been doing work for radio manufacturers have had some contracts cancelled, and it is reported that several automobile manufacturers east of Chicago have held up delivery of machine tools recently ordered.

The Burlington is in the market for a portable lathe, and the Louisville & Nashville will buy a turret lathe. Additional requests have come from railroads for estimates to be used in preparing budgets for 1930.

W. J. Korber, 263 North California Avenue, Chicago, will build a two-story machine shop, 52 x 127 ft., to cost \$37,000. L. M. Mitchell, 127 North Dearborn Street, is architect.

Factory of Rich Toy Co., Morrison, Ill., was badly damaged by fire Nov. 8.

B. D. and H. D. Adams, owners of Adams Mfg. Co., Galesburg, Ill., have purchased Meyer-Foley Co., same city, and will consolidate operations. Automotive accelerators, footrests, pressed steel pulleys, metal stampings for washing machines and similar special machinery are manufactured.

Willis Motor Corporation, Maywood, Ill., has acquired property near Batavia, Ill., and contemplates erection of a large plant to manufacture motors.

Foot Gear Works, Chicago, has moved from 430 North Oakley Boulevard to 1301 South Cicero Avenue.

Compressed Industrial Gases, Inc., 19 North Sheldon Street, Chicago, through its subsidiary, Burdett Oxygen & Hydrogen Co., Chicago, manufacturer of oxygen, hydrogen and acetylene, has plans for a dissolved acetylene plant at Summit, Ill., industrial suburb of Chicago, to cost, with equipment, about \$100,000.

Factory addition of Gardner-Denver Co. at Quincy, Ill., is nearing completion. Company manufactures slush and mud pumps, air compressors, rock drills, drill sharpeners and high pressure drill steel forges. Its other two plants are at Denver and LaGrange, Mo.

Schlangen Brothers Co., 2435 Irving Park Boulevard, Chicago, manufacturer of builders' hardware, etc., is considering multi-story plant addition, to cost over \$200,000 with equipment.

G. F. Wright Steel & Wire Co., 13 West Ohio Street, Chicago, manufacturer of wire goods, wire cloth, etc., has leased four floors in building at 22 West Austin Avenue for new plant. Present capacity will be increased.

Kling Brothers Engineering Works, Inc., 1300 North Kostner Avenue, Chicago, operating a general machine plant, has filed plans for a two-story addition, 50 x 60 ft., to cost about \$45,000 with equipment.

Illinois Cork Co., 1450 West Forty-third Street, Chicago, contemplates early rebuilding of part of plant destroyed by fire Nov. 3, with loss reported close to \$100,000, including equipment.

Chicago, St. Paul, Minneapolis & Omaha Railroad Co., 275 East Fourth Street, St. Paul, Minn., has awarded general contract to J. B. Nelson Construction Co., Mankato, Minn., for new engine house and shops at Mankato, to cost more than \$60,000 with equipment. H. E. Barlow, address noted, is chief engineer.

Christy Mfg. Co., Pueblo, Colo., A. B. Christy, Vail Hotel, head, has plans for new two-story and basement plant to manufacture juvenile furniture and kindred products, to cost about \$100,000 with equipment.

Bureau County Board of Supervisors, Princeton, Ill., E. L. Schoenberger, American Hotel Building, in charge, has plans for a one-story machine and repair shop, to cost about \$30,000 with equipment.

Northwest Airways, Inc., Merchants National Bank Building, St. Paul, Minn., has awarded general contract to Paul Steenberg Construction Co., Builders' Exchange Building, for hangar, 130 x 200 ft.; machine and repair shop, 30 x 200 ft., and other units at St. Paul airport, to cost \$100,000 with equipment. L. H. Brittin is vice-president and general manager.

Spanjer Brothers, Inc., 1160 Chatham Court, Chicago, manufacturer of signs, displays, etc., has awarded general contract to B. J. Regnall Co., 19 South LaSalle Street, for three-story addition, 25 x 150 ft., to cost about \$60,000 with equipment. H. Ronneberg, 10 South LaSalle Street, is architect.

Northern Pacific Railroad Co., St. Paul, Minn., is planning extensions and improvements in repair shops and yards at Glendive, Mont. Present car repair shop at Dickinson, Mont., will be removed to Glendive and capacity increased. Program will cost about \$70,000 with equipment.

Cleveland

CLEVELAND, Nov. 11.—Machine tool sales were rather light the past week and were limited to single items. The liquidation in the stock market has had an effect on the machine tool market in that some companies that had been figuring on buying a little additional equipment have decided to postpone purchases until they can draw more definite conclusions as to the future prospects for business. The recent slowing down in plant operations that has caused curtailment in plants making automobile parts appears to have extended to some plants making airplane parts.

New York, Chicago & St. Louis Railroad Co., Terminal Tower, Cleveland, has plans for one-story car repair shop at local yards, to cost about \$60,000 with equipment. A. C. Harvey is chief engineer.

Cleveland Wax Paper Co., 2217 Scranton Road, Cleveland, manufacturer of processed papers, has awarded general contract to S. W. Emerson Co., 1836 Euclid Avenue, for one-story addition, to cost about \$50,000 with equipment.

Atlas Steel & Supply Co., 4401 Trumbull Avenue, Cleveland, will soon take bids on general contract for three-story addition to storage and distributing plant, to cost over \$65,000 with equipment. W. J. Wefel, 5716 Euclid Avenue, is architect.

Alliance Drop Forge Co., Alliance, Ohio, is considering one-story addition to cost about \$50,000 with equipment.

Toledo Scale Co., Monroe and Albion Streets, Toledo, Ohio, has plans for new unit, to cost over \$75,000 with equipment. Norman Bel Geddes, 128 East Thirty-seventh Street, New York, is architect.

Dill Mfg. Co., 684 East Eighty-second Street, Cleveland, manufacturer of screw machine products, etc., has awarded general contract to D. C. Hamel Construction Co., Plymouth Building, for plant unit, to cost more than \$65,000 with equipment. Roberts-Wright Co., Swetland Building, is architect and engineer.

Fate-Root-Heath Co. (Plymouth Locomotive Works), Plymouth, Ohio, manufacturer of industrial and railroad locomotives, has completed a large new factory unit. Equipment, which is now being installed, will double present output of Plymouth gear-drive gasoline and Diesel locomotives. Company also manufactures gas-electric and Diesel-electric locomotives from 20 to 100 tons.

Sterling Grinding Wheel Co., Tiffin, Ohio, has plant expansion program which will include construction at once of a building with 18,000 sq. ft. of floor space, and another of like size to be started as soon as the first is completed. Company will also purchase new shop equipment. Expenditures will total about \$100,000.

Milwaukee

MILWAUKEE, Nov. 11.—While a few machine tool dealers report a falling off in sales and inquiries, manufacturers of machine tools, have not yet felt a recession. Demand is general, with the exception of the automotive industry, a good share coming from small machine shops. Expansion of metal working plants appears to have been unaffected by the collapse in the stock market, and no abandonment of pending programs is reported. A surplus of metal workers in the local labor market is attributed mainly to depression in the automotive lines.

George H. Smith Steel Casting Co., 500 Clinton Street, Milwaukee, will begin construction next spring of a one-story plant on 21-acre tract, recently purchased, to provide for foundry expansion and consolidation of units of Trackson Co., a subsidiary. Trackson Co. manufactures crawler tracks, loaders, bulldozers and cranes for tractor mounting largely marketed through the United Tractor & Equipment Corporation.

Board of School Directors, Milwaukee, has ordered plans from G. E. Wiley, architect, for a four-story addition to Girls' Technical and Trade High School, to cost \$350,000. Frank M. Harbach is secretary and business manager of board.

Snap-On Wrench Co., 1270 South Pierce Street, Milwaukee, will start immediate construction of new shop, 200 x 330 ft., and office, 80 x 100 ft., at Kenosha, Wis., to cost \$175,000, exclusive of \$125,000 which the company will spend for machinery. Frank D. Chase, Inc., 720 North Michigan Avenue, Chicago, engineer, closed bids Nov. 7.

Cary Co., Waupaca, Wis., manufacturer of oil burners, has completed removal of plant and headquarters from Minneapolis,

Minn., to Waupaca, following acquisition of Jorgenson Mfg. Co. plant and 20-acre tract, and has completed a hydroelectric plant on Crystal River to supply all power needs.

Indiana

INDIANAPOLIS, Nov. 11.—Leader Specialty Co., 515 East Walnut Street, Indianapolis, manufacturer of plumbing equipment and supplies, has asked bids on general contract for one-story plant, 45 x 112 ft., to cost about \$25,000 with equipment. Bacon & Tislow, Architects' & Builders' Building, are architects. Claude J. Mick is general manager.

Inca Mfg. Corporation, Fort Wayne, recently organized to manufacture copper wire products for radio, electric and other service, has work nearing completion on initial unit of new plant, one story, 200 x 300 ft., to cost more than \$100,000. George A. Jacobs, formerly president of Dudlo Mfg. Co., with local plant in same line, is president of new organization.

Buhner Fertilizer Co., Seymour, is planning to rebuild fertilizer manufacturing plant destroyed by fire Nov. 4.

Bendix Brake Corporation, South Bend, manufacturer of automobile brakes, etc., has filed plans for three one-story units, 200 x 300 ft., 150 x 220 ft., and 150 x 350 ft., each to cost about \$150,000 with equipment. Units will be used as a tool room, screw machine shop, and for storage and distribution.

Midwestern Petroleum Co., Indianapolis, recently organized, will erect new storage and distributing plant at Twenty-first and Yandes Streets, to cost \$50,000 with equipment. Other units will be built later. Eugene W. Fields is president, and Charles E. Foreman, secretary and treasurer.

Plant and property of Henry Weis Mfg. Co., Elkhart, manufacturer of steel partitions, crucibles, etc., has been transferred by Henry Weis, founder, and his son, William M. Weis, to a group of seven veteran employees, who will own and operate business in future. Mr. Weis and his son are retiring from active business. Paul W. Kerr, heretofore vice-president, will be president of reorganized company.

Time-O-Stat Controls Co., Elkhart, will soon use 79,000 sq. ft. of additional floor space. Plant, which manufactures heat regulating devices, is a consolidation of several scattered factories. Company states that further additions will be necessary in near future.

Plans for a new airplane factory to be built at Connersville by Corman Aircraft Corporation of Indiana have been announced by Ellis W. Ryan, resident director of company. Plant is to be completed by Feb. 1 and will manufacture tri-motor transport planes. Corman company is owned by Cord Corporation, which also controls Stinson Aircraft Corporation, Wayne, Mich.

W. C. Fletcher Co., Inc., 502 Illinois Building, Indianapolis, has been appointed sales representative for central Indiana by Bradley Washfountain Co., Milwaukee. For southern Indiana and Kentucky, J. F. Shouse & Co., 1197 Stark Building, Louisville, has been placed in charge of Bradley Washfountain sales.

Benjamin H. Rhyneearson Co., dealer in new and used machine tools, is occupying a new warehouse at 516 West McCarty Street, Indianapolis, where new and used tools will be carried in stock.

Capitol Stampings Co., 516 West McCarty Street, Indianapolis, a new organization, will engage in manufacture of light stampings, tool and die work. It will be under management of C. R. Swenson, formerly connected with Oakes Mfg. Co. and later Indiana Press & Steel Co.

Gulf States

BIRMINGHAM, Nov. 11.—Contract has been let by Electric Belle Range Co., Huntsville, Ala., to G. A. Rogers, Huntsville, for a two-story addition, 52 x 144 ft., for enameling, to cost about \$27,000.

Lufkin Foundry & Machine Co., Lufkin, Tex., has plans for a two-story addition, to cost close to \$21,000.

Grayburg Oil Co., San Antonio, Tex., is considering new oil refinery and by-products plant on local site, with steam power plant, machine shop and other units, to cost over \$2,000,000 with equipment. A storage and distributing plant will be installed.

Lockhart & Co., Pecos, Tex., operating oil properties in Loving County oil field north of city, have authorized surveys for a new pipe line with terminus at Pecos, to cost about \$100,000 with booster stations. It is expected to begin work early in January.

Seaboard Soap Corporation, Hialeah, Fla., is considering rebuilding part of plant recently destroyed by fire with loss reported over \$100,000 including equipment.

Curtiss Flying Service, Inc., 27-29 West Fifty-seventh Street, New York, is considering purchase of site at South Jacksonville, Fla., about 1500 x 1800 ft., for airport, to include hangars, repair shops and other field units, as well as facilities for seaplanes, to cost more than \$100,000 with equipment.

Border Foundry & Machine Co., Corpus Christi, Tex., has expansion program under way at boat repair plant, including runway for drawing vessels from water, with hoisting, elevating and other equipment. Blucher Engineering Co., Corpus Christi, is engineer.

Under direction of a committee of Oak Cliff-Dallas Commercial Association, Dallas, Tex., plans will soon be drawn for a new vocational school in Oak Cliff district, where 20-acre tract has been secured. Project will include shops for mechanical, electrical, automobile mechanics and other trade instruction. Initial units will cost \$100,000 with equipment. T. E. Jackson is chairman of committee in charge.

Texas & Pacific Railway Co., Dallas, Tex., plans rebuilding part of ice-manufacturing plant at Fort Worth, Tex., destroyed by fire Nov. 5, with loss reported close to \$100,000 with equipment. Plant was in course of construction and was nearing completion; destroyed unit was designed primarily for refrigerator car service. Entire project will represent investment of \$250,000.

City Council, Austin, Tex., is planning fund of about \$85,000 for establishment of municipal airport, including hangars, repair shops and other field units. Following completion, airport will be leased to Southern Air Transport, Inc., Fort Worth National Bank Building, Fort Worth, Tex.

Swift & Co., Union Stock Yards, Chicago, have acquired a 10-acre tract at Montgomery, Ala., for new plant, including refrigerating and cold storage department, to cost more than \$250,000 with

equipment. Latter will include elevating, conveying and other mechanical-handling facilities.

Interstate Natural Gas Co., Natchez, Miss., is planning new pipe line from Natchez to Woodville, Miss., to cost more than \$750,000 with compressor stations and other equipment.

St. Louis

ST. LOUIS, Nov. 11.—Western Supplies Co., 2129 Pine Street, St. Louis, manufacturer of shoemaking machinery, parts, etc., has awarded general contract to F. F. Meckfessel Construction Co., 6625 Delmar Boulevard, for one and two-story plant, 100 x 325 ft., to cost about \$35,000 with equipment. Julius Tarling, 2806 North Grand Boulevard, is architect.

Specialty Tool Corporation, Oklahoma City, Okla., has filed plans for a one-story machine shop, 35 x 100 ft., to cost about \$21,000 with equipment.

Missouri-Pacific Railroad Co., Railway Exchange Building, St. Louis, has awarded general contract to T. H. Johnson, 107 Ohio Street, Sedalia, Mo., for one-story spring shop at Sedalia yards, to cost more than \$40,000 with equipment. E. A. Hadley is chief engineer.

City Council, Ellis, Kan., has authorized construction of new municipal electric light and power plant to replace present unit, including installation of additional equipment, to cost \$70,000. E. R. Gibson is city clerk.

Muskogee Iron Works, Inc., Muskogee, Okla., has plans for a one-story machine shop, 25 x 160 ft., to cost about \$25,000 with equipment. H. H. Niemann, Barnes Building, is architect. Company will also build two-story office, 40 x 105 ft., on adjoining site.

Guardian Aircraft Corporation, 2504 Texas Avenue, St. Louis, has awarded general contract to Bell Brothers, Inc., Moberly, Mo., for aviation school at Moberly, including one-story aircraft repair and reconditioning shop, to cost over \$60,000 with equipment. Ludwig Abt, Reigle Building, St. Louis, is architect.

Carter-Waters Co., 2049 Main Street, Kansas City, Mo., road-building materials and supplies, has plans for a four-story storage and distributing plant, 75 x 100 ft., including road oil and asphalt distributing division, to cost about \$70,000 with equipment. Archer & Gloyd, Pioneer Building, are architects.

Red Bird Aircraft Co., Hiawatha, Kan., is considering one-story airplane manufacturing plant, with parts and assembling departments, to cost about \$30,000 with equipment.

Board of Education, Crawford, Neb., has authorized installation of manual training department in new three-story and basement high school to cost about \$130,000, for which bids are being asked on general contract. Meginnis & Schaumburg, Federal Trust Building, Lincoln, Neb., are architects.

Public Service Co. of Oklahoma, Tulsa, has plans for addition to steam-operated electric power plant at Weleetka, Okla., to cost more than \$800,000 with equipment. Company will also build transmission lines in different parts of State, to cost over \$200,000.

DeCamp Consolidated Glass Casket Co., Muskogee, Okla., is building two-story and basement addition, 75 x 150 ft., to cost close to \$45,000 with equipment. H. H. Niemann, Barnes Building, is architect.

Cincinnati

CINCINNATI, Nov. 11.—Demand for machine tools so far this month has been fairly good, much better, in fact, than was anticipated following the stock market collapse and the slackening of activity in the automobile industry. No let up in production schedules has been reported, and machine tool manufacturers in this district indicate that the present high rate of operations will continue well into next year. Inquiry, generally, is good, with a noticeable increase in requests for quotations from Canada. An automobile manufacturer placed an order with a local maker for five new crankshaft lathes and for rebuilding 15 others.

It is reported that further inquiries are pending from the Russian Government for machine tools; these are expected to be closed in the near future.

City Council, City Hall, Cincinnati, has awarded general contract to William Miller & Son, 1952 Central Parkway, for hangar at Lunken airport, with reconditioning and repair shop facilities, to cost \$100,000 with equipment. Truckmeyer & Strong, St. Paul Building, are architects.

Estate Stove Co., Hamilton, Ohio, has filed plans for one-story addition, including extensions in power plant, to cost about \$60,000 with equipment. Carl J. Kiefer, Schmidt Building, Cincinnati, is engineer.

City Council, Nicholasville, Ky., is contemplating extensions in municipal electric light and power plant, including installation of additional equipment.

Allen Mfg. Co., Tenth Avenue, North, Nashville, Tenn., manufacturer of stoves, ranges, etc., has awarded general contract to Roberts Construction Co., Birmingham, for grading, foundations, etc., for new plant at Franklin, Tenn., and to Nashville Bridge Co., Nashville, for steel frame superstructure. Unit will have about 150,000 sq. ft. floor space and will cost \$200,000 with equipment. Robert & Co., Bona Allen Building, Atlanta, Ga., are architects and engineers.

D. X. Murphy, Louisville Trust Building, Louisville, architect, has plans for three-story automobile service, repair and garage building, to cost about \$120,000 with equipment.

Coca-Cola Bottling Co., Memphis, Tenn., has filed plans for one and two-story plant, to include installation of elevating, conveying and other mechanical-handling equipment, to cost about \$35,000. H. E. Brooks, 63 South Third Street, is architect and engineer.

Conway Clutch Co. is moving its plant to larger quarters at 1543 Queen City Avenue, Cincinnati.

Pacific Coast

SAN FRANCISCO, Nov. 7.—Aircraft Industries, Ltd., 935 East Fourteenth Street, Oakland, has awarded general contract to George Beard, 726 Tenth Street, Modesto, Cal., for new airplane parts manufacturing and assembling plant at Modesto, to cost \$65,000 with equipment. H. S. Thorpe is one of heads of company in charge.

Fresno-Madera Ice Co., Fresno, Cal., is considering one-story ice-manufacturing plant at Stockton, Cal., to cost about \$80,000 with machinery.

Link Belt, Meese & Gottfried Co., 3100 Nineteenth Street, San Francisco, manu-

facturer of elevating, conveying and other transmission equipment, has engaged Austin Co. of California, Russ Building, to prepare plans for new plant group, to cost about \$400,000 with equipment.

Botchford Steel Co., San Francisco, recently organized, has taken over plant and business of Judson Mfg. Co., Emeryville, Cal., manufacturer of steel products, including castings, etc., and will operate in future. Plans are under way for expansion and installation of additional equipment.

Arizona Edison Co., Phoenix, Ariz., is considering construction of ice-manufacturing plant at Coolidge, Ariz., with all equipment electrically operated, to cost about \$100,000.

St. Paul-Tacoma Lumber Co., Tacoma, Wash., is planning mill at Bellingham, Wash., consisting of three-story units for shingle mill, planing mill and saw mill, to cost about \$200,000 with equipment. All machinery will be electrically operated.

Northwest Terminals, Inc., Seattle, has plans for first unit of new oil storage and distributing plant on Harbor Island, to cost about \$300,000 with equipment. A similar unit will be built at Linton, Wash., to cost about \$200,000 with equipment.

Firestone Tire & Rubber Co., Akron, Ohio, has awarded general contract to Clinton Campbell, 90 West Moreland Street, Phoenix, Ariz., for a factory branch, service and distributing plant at Phoenix, to cost about \$150,000 with equipment.

Martinez Junior High School District, Martinez, Cal., plans installation of manual training shop at new junior high school group to cost about \$250,000, for which plans are being completed by W. H. Weeks, Hunter-Dulin Building, San Francisco, architect.

H. H. Knowles, Pacific Coast representative of Reading Chain & Block Corporation, Reading, Pa., has announced appointment of Murry Jacobs Co., 554 South Pedro Street, Los Angeles, to represent Reading Chain & Block Corporation in southern California.

W. A. Jones Foundry & Machine Co., Chicago, has moved its Los Angeles office to 342 Towne Avenue. Warren C. Webb is Pacific Coast sales manager.

Canada

TORONTO, Nov. 11.—The slowing down of automobile production has materially affected machine tool sales in this territory. At present the smaller shops are responsible for the bulk of new business, with the call principally for single tools. Used and rebuilt tools are quite active. Although there has been a falling off in demand recently, business as a whole is fairly good. Small tools have also been affected by the decline in the automotive industry. Sales of mining machinery are holding at a good level.

Sackville Shops, Ltd., recently formed, has purchased plant and business of G. E. Bilton Furniture Co., 27 Sackville Place, Toronto. It is understood that some improvements will be made, including installation of new equipment. Col. W. R. Patterson is manager of new company.

Bids will be called soon for erection of a \$70,000 addition to plant of the Hoyt Metal Co., 721 Eastern Avenue, Toronto. Company's own engineer is in charge.

Additional contracts have been awarded for erection of a \$200,000 plant addition for McKinnon Industries, Ltd., St. Catharines, Ont. Construction is under way, but equipment has not yet been purchased.

Smelting & Refining Co., Ltd., Smith's Falls, Ont., has let contract to D. Dignan, Russell Street, for alterations and improvements to plant.

Bids are being received by Frank T. Adams, engineer, City Hall, Brantford, Ont., for two or three Diesel engine units, two of 450 to 500 hp. each, or three of 300 to 350 hp. each. Motor-driven pumps with capacity of four to six million gal. each also will be purchased. W. S. and R. S. Lea, 1226 University Avenue, Montreal, are consulting engineers.

Bids are being received, no closing date, by Alward & Gilles, architects, Market Square, St. John, N. B., for a \$10,000 factory addition to Brantford Carritte Co., Ltd., Coldbrook Street, manufacturer of builders' paper, etc.

A number of contracts have been awarded for an airplane manufacturing plant at Longueuil, Que., to cost \$300,000, for Fairchild Aircraft, Ltd., 1253 McGill College Avenue, Montreal, St. George & Gauvreau, Ltd., 4820-4th Avenue, Rosemount, Que., have general contract.

Western Canada

Powell River Co., Ltd., Vancouver, B. C., is receiving bids and will continue into December to award contracts for a \$6,000,000 power development plant on Lois River, 14 miles south of town of Powell River, to develop 18,000 hp. Company also proposes to build a second paper mill on Powell River site. A. E. McMaster is general manager.

Foreign

PROPERTY near Havana, Cuba, has been acquired by Atlas Portland Cement Co., 25 Broadway, New York, as site for new mill, with power house and other mechanical buildings, to cost over \$1,000,000 with equipment.

Societe des Produits Chimiques de Saint-Cobain, Paris, France, manufacturer of sulphuric acid, etc., is reported planning construction of new plant near La Bessee, France, to cost more than \$3,500,000 with equipment.

Swedish Cellulose Co., Stockholm, Sweden, recently formed as subsidiary of Kreuger & Toll Co. (Aktiebolaget Kreuger & Toll), Stockholm, to acquire wood pulp companies with mills in northern part of Sweden, has purchased Sundsvalls Cellulose Co., with mill in same district, having rated capacity of 35,000 tons a year. Extensions and betterments are planned. Plans are under way for new centralized sulphite pulp mill to develop capacity of 100,000 tons of finished material a year, to cost more than \$2,500,000 with equipment. Hammersfors Water Power Co., another subsidiary of parent company noted, operating hydroelectric generating plants of 85,000 hp. capacity, is considering expansion for additional hydroelectric power facilities for pulp mills. Ivar Kreuger is head.

Southern Cities Utilities Co., 1612 Market Street, Philadelphia, operating electric light and power properties, has purchased properties of Compagnie D'Eclairage Electrique, operating two generating plants and systems at Port-au-Prince and Cape Haitien, Republic of Haiti, and will consolidate properties. Plans are under way for expansion in generating plants and transmission facilities.

The Week's News Quickly Told

Current Events That Bear on the Course of Business

STOCKS sold under heavy pressure, the composite average of 100 leading issues declining 11 points during shortened trading sessions. Bonds also were active and gradually increased in price. Extra dividends were declared by a number of industrial corporations, banks and insurance companies.

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FAILURES last week numbered 402 as compared with 414 the preceding week. An investment trust, Banker's Capital Corporation, which showed large earnings from bank stocks in 1927 and 1928, was unable to meet its pressing obligations. . . . A proposed merger of big New York banks has been abandoned because so many stockholders elected to receive cash for their holdings at a price agreed upon before the recent decline.

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TRADE and industry are going forward generally in volume about equal to this date last year. Retail trade has not been affected much by the stock market's decline, but wholesale and jobbing trade is on a "small order, prompt shipment" basis. October was a banner month for mail order and chain stores. To quote Julius Rosenwald, of Sears, Roebuck & Co.: "I do not say that future business is going to be good, but it should be."

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COMMODITIES continue to decline; Fisher's index is down from 93.7 to 93.3. Grains, live stock, cotton, sugar, coffee and rubber all registered sizeable decreases in price. . . . A leading carpet maker (M. J. Whittall Associates) has reduced prices on Wilton rugs \$10 to \$15 on the 9 x 12 size.

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RADIO prices have been reduced from \$15 to \$60 by four of the leading manufacturers to aid dealers in disposing of large accumulations of unsold sets. Manufacturing schedules are sharply reduced. . . . Radio Corporation of America, which earned \$7.50 per share during nine months in 1928, reports \$1.30 for the corresponding period this year, based on additional stock of Victor Talking Machine Co.

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LUMBERING, both hard wood and soft wood, is producing at about 10 per cent higher rate than new orders are coming in. . . . While forest products are less active in the Pacific Northwest, all factories in Washington are employing 5000 more men than the peak figures, registered in 1928.

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PETROLEUM production has decreased slightly. In one California field, where operators have agreed to curtail production 30 per cent, the price of crude oil has been advanced 50c. per barrel. . . . A similar curtailment in other California fields,

matching that achieved in Kansas and Oklahoma, will balance production against consumption for the first time in years, according to E. B. Reeser, president American Petroleum Institute. . . . Oil held in storage tanks now totals 700,000,000 barrels, almost half of which is fuel oil (which is selling at prices lower than the equivalent in coal). Remainder equals four months' production of crude.

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SAVINGS deposits and depositors decreased for the first time in 20 years. On June 29, 1929, total deposits were \$195,000,000 less than on June 29, 1928. (During the preceding year the increase was \$2,250,000,000.) Deposits of individuals, both time and demand, shrunk even more during the last fiscal year, despite an increase of \$500,000,000 in the total amount of currency in circulation.

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GYROSCOPIC control of rudders, elevators and ailerons, proved successful in long test flights across the Allegheny mountains in fog. . . . Construction of giant dirigible for the Navy commenced at Akron. . . . A 40-passenger Junkers land plane of the "all wing" type, powered with four self-starting engines, flew for 30 min. in Germany. Dr. Claude Dornier said that an airplane can be built to carry 100 tons useful load as soon as engine designers can produce the necessary power plant. . . . Army air corps, which had authorized a five-year developmental program, but for which appropriations have been lagging, is awarded a full fifth of the total in next year's budget. . . . Annual deficit of the air mail is about \$5,000,000. Postmaster General says the air mail should not be used promiscuously, but be regarded as a special service for business men. . . . In the last 12 months 82 aviation companies have offered \$250,000,000 par value of new securities. . . . Daniel Guggenheim Fund for the promotion of aeronautics, having spent \$2,500,000 in three years, will go out of existence on New Year's, since various institutes and universities are now equipped to carry on its research and development work.

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BARGE canal across New York should not be deepened to 14 ft., in the opinion of a board of Army engineers, because the present facilities can handle twice as much as the existing tonnage, and traffic conditions will soon be altered by improvements to the Welland Canal and the Hudson River. . . . Completion of the Dixie Highway, from Sault Ste. Marie, Mich., to Miami, Fla., started in 1915, was celebrated by opening a hard surfaced road from Chattanooga, Tenn., to Atlanta, Ga. . . . Pennroad Corporation, allied to the Pennsylvania Railroad, bought stock control of Pittsburgh & West Virginia Railway, a line claimed by two rival rail consolidations.